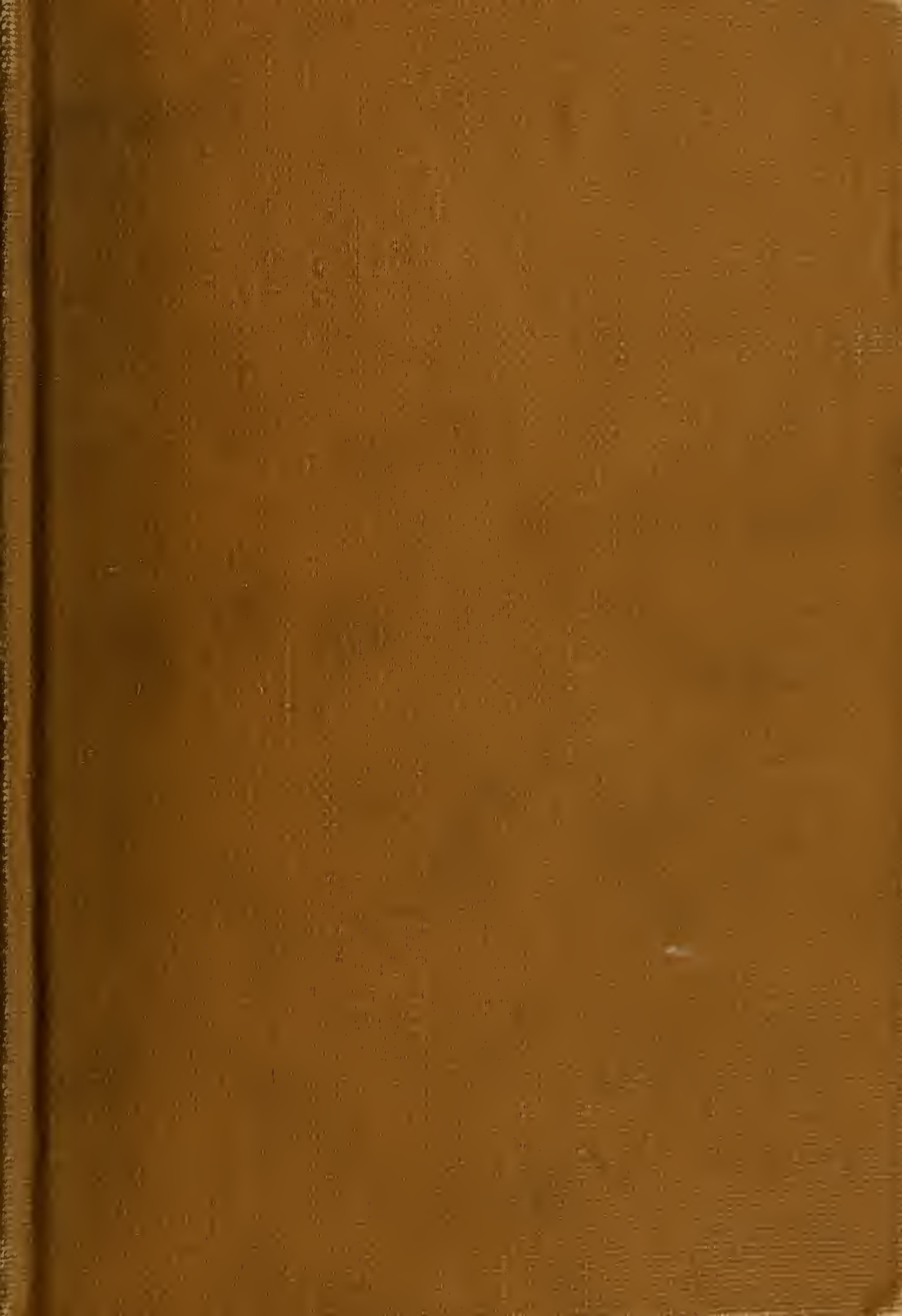








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Map of the Campus of LEHIGH UNIVERSITY

1. Lehigh Alumni Memorial Building
2. Packard Laboratory of Electrical and Mechanical Engineering
3. Packer Memorial Chapel
4. Christmas-Seaton Hall
5. Fris Laboratory
6. Shops
7. Wilmer Laboratory and Power House
8. Physics Building
9. Chemistry Building
10. Williams Hall
11. Library
12. Cross Laboratory of Mining Engineering
13. Course Hall
14. Armory
15. Brown Hall
16. Packer Hall
17. President's House
18. Taylor Stadium
19. Taylor Gymnasium
20. Price Hall, Dormitory
21. Delta Tau Delta
22. Taylor Hall, Dormitories
23. Sigma Nu
24. Delta Upsilon
25. Psi Upsilon
26. Phi Delta Theta
27. Theta Delta Chi
28. Beta Theta Pi
29. Alpha Tau Omega
30. Chi Psi
31. Phi Gamma Delta
32. Chi Phi
33. Saris Observatory
34. Richards House, Dormitory
35. Drinker House, Dormitory
36. Grace Hall
- F. Faculty Residence



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1940/41

Lehigh University Publication

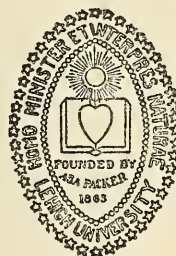
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MARCH, 1941

No. 3

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ANNOUNCEMENT, 1941-1942



BETHLEHEM, PENNSYLVANIA

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LEHIGH UNIVERSITY

1940							1941							1942						
JULY							JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	..	..	1	2	3	4	5	..	1	2	3	4	5	6
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26
28	29	30	31	..	..	..	26	27	28	29	30	31	..	27	28	29	30	31	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
AUGUST							FEBRUARY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	..	..	1	..	..	..	..	..	1	2
4	5	6	7	8	9	10	2	3	4	5	6	7	8	3	4	5	6	7	8	9
11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16
18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23
25	26	27	28	29	30	31	23	24	25	26	27	28	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..
SEPTEMBER							MARCH							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	..	..	..	..	..	..	1	..	1	2	3	4	5	6
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22	23	24	25	26	27	28	16	17	18	19	20	21	22	21	22	23	24	25	26	27
29	30	..	..	..	..	..	23	24	25	26	27	28	29	28	29	30	..	..	..	..
..	..	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
OCTOBER							APRIL							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	1	2	3	4	5	6	..	1	2	3	4	5	6	..	1	2	3	4	5	6
7	8	9	10	11	12	13	6	7	8	9	10	11	12	5	6	7	8	9	10	11
14	15	16	17	18	19	20	13	14	15	16	17	18	19	12	13	14	15	16	17	18
21	22	23	24	25	26	27	20	21	22	23	24	25	26	19	20	21	22	23	24	25
28	29	30	31	..	..	..	27	28	29	30	..	..	..	26	27	28	29	30	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
NOVEMBER							MAY							NOVEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	1	2	3
4	5	6	7	8	9	10	4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	..	25	26	27	28	29	30	31	23	24	25	26	27	28	29
..	..	..	..	..	..	..	..	..	..	..	..	..	..	30	..	..	..	..	..	..
DECEMBER							JUNE							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	1	2	3	4	5	6	7	..	1	2	3	4	5	6
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15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	31	..	..	..	..	29	30	..	..	..	..	..	28	29	30	31	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Days on which classes are held, exclusive of summer sessions, are printed in heavy type.

UNIVERSITY CALENDAR

210902

1940-1941

1940

Aug. 1 (Thurs.)	Last day for filing applications for re-examinations
Sept. 4, 5, 6, 7 (Wed.-Sat.)	Examinations for admission
Sept. 4, 8:00 a.m. (Wed.)	Route surveying course begins
Sept. 9, 3:00 p.m. (Mon.)	First faculty meeting
Sept. 10, 11, 12, 13, 14 (Tues.-Sat.)	Freshman Week
Sept. 10, 11, 12, 13, 14 (Tues.-Sat.)	Fall re-examinations
Sept. 16, 17, 18 (Mon.-Wed.)	Undergraduate registration
Sept. 18, 5:00 p.m. (Wed.)	Route surveying course ends
Sept. 19, 8:10 a.m. (Thurs.)	First semester begins
Sept. 19, 20, 21 (Thurs.-Sat.)	Graduate registration
Sept. 25 (Wed.)	Last day for filing applications for degrees to be conferred on Founder's Day
Sept. 30 (Mon.)	Last day for registration
Oct. 2 (Wed.)	Founder's Day (holiday)
Oct. 31 (Thurs.)	Mid-semester reports
Nov. 23 (Sat.)	Alumni Homecoming Day
Nov. 27, 4:00 p.m. (Wed.)	Thanksgiving holidays begin
Dec. 2, 8:10 a.m. (Mon.)	Thanksgiving holidays end
Dec. 21, 12 m. (Sat.)	Christmas holidays begin

1941

Jan. 6, 8:10 a.m. (Mon.)	Christmas holidays end
Jan. 15, 12 m. (Wed.)	Instruction ends
Jan. 16, 8:00 a.m. (Thurs.)	Examinations begin
Jan. 22, 23, 24, 25 (Wed.-Sat.)	Examinations for admission
Jan. 25, 6:00 p.m. (Sat.)	Examinations end
Jan. 28, 29 (Tues.-Wed.)	Undergraduate registration
Jan. 30, 8:10 a.m. (Thurs.)	Second semester begins
Jan. 30, 31, Feb. 1 (Thurs.-Sat.)	Graduate registration
Feb. 10 (Mon.)	Last day for registration
Mar. 22 (Sat.)	Mid-semester reports
Mar. 22, 12 m. (Sat.)	Spring vacation begins
Mar. 31, 8:10 a.m. (Mon.)	Spring vacation ends
Apr. 17 (Thurs.)	General engineering aptitude test
May 3 (Sat.)	Sub-freshman Day
May 5, 1:00 p.m. (Mon.)	Annual Military Field Day
May 14, 4:00 p.m. (Wed.)	Instruction for arts seniors ends
May 15 (Thurs.)	Last day for filing applications for degrees to be conferred on University Day
May 17, 19, 20, 21 (Sat.-Wed.)	Senior arts comprehensive examinations
May 21, 12 m. (Wed.)	Instruction ends
May 22, 8:00 a.m. (Thurs.)	Examinations begin
May 31, 6:00 p.m. (Sat.)	Examinations end
June 2 (Mon.)	Summer engineering courses begin
June 4, 5 (Wed.-Thurs.)	Senior re-examinations
June 7 (Sat.)	Alumni Day and Class Day
June 8 (Sun.)	Baccalaureate Sunday
June 9 (Mon.)	University Day
June 9, 8:00 a.m. (Mon.)	Route surveying course begins
June 11, 12, 13, 14 (Wed.-Sat.)	Examinations for admission
June 21, 12 m. (Sat.)	Route surveying course ends
June 28 (Sat.)	Summer engineering courses end
June 30 (Mon.)	Summer session begins
Aug. 1 (Fri.)	Last day for filing applications for re-examinations
Aug. 9 (Sat.)	Summer session ends

UNIVERSITY CALENDAR—Continued

1941-1942

1941

Aug. 1 (Fri.)	Last day for filing applications for re-examinations
Sept. 3, 4, 5, 6 (Wed.-Sat.)	Examinations for admission
Sept. 8, 3:00 p.m. (Mon.)	First faculty meeting
Sept. 9, 10, 11, 12, 13 (Tues.-Sat.)	Freshman Week
Sept. 9, 10, 11, 12, 13 (Tues.-Sat.)	Fall re-examinations
Sept. 15, 16, 17 (Mon.-Wed.)	Undergraduate registration
Sept. 18, 8:10 a.m. (Thurs.)	First semester begins
Sept. 18, 19, 20 (Thurs.-Sat.)	Graduate registration
Sept. 25 (Thurs.)	Last day for filing applications for degrees to be conferred on Founder's Day
Sept. 29 (Mon.)	Last day for registration
Oct. 3 (Fri.)	Founder's Day (holiday)
Oct. 30 (Thurs.)	Mid-semester reports
Nov. 22 (Sat.)	Alumni Homecoming Day
Nov. 26, 4:00 p.m. (Wed.)	Thanksgiving holidays begin
Dec. 1, 8:10 a.m. (Mon.)	Thanksgiving holidays end
Dec. 20, 12 m. (Sat.)	Christmas holidays begin

1942

Jan. 5, 8:10 a.m. (Mon.)	Christmas holidays end
Jan. 14, 12 m. (Wed.)	Instruction ends
Jan. 15, 8:00 a.m. (Thurs.)	Examinations begin
Jan. 21, 22, 23, 24 (Wed.-Sat.)	Examinations for admission
Jan. 24, 6:00 p.m. (Sat.)	Examinations end
Jan. 27, 28 (Tues.-Wed.)	Undergraduate registration
Jan. 29, 8:10 a.m. (Thurs.)	Second semester begins
Jan. 29, 30, 31 (Thurs.-Sat.)	Graduate registration
Feb. 9 (Mon.)	Last day for registration
Mar. 21 (Sat.)	Mid-semester reports
Mar. 21, 12 m. (Sat.)	Spring vacation begins
Mar. 30, 8:10 a.m. (Mon.)	Spring vacation ends
Apr. 17 (Fri.)	General engineering aptitude test
May 2 (Sat.)	Sub-freshman Day
May 4, 1:00 p.m. (Mon.)	Annual Military Field Day
May 13, 4:00 p.m. (Wed.)	Instruction for arts seniors ends
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May 20, 12 m. (Wed.)	Instruction ends
May 21, 8:00 a.m. (Thurs.)	Examinations begin
May 30, 6:00 p.m. (Sat.)	Examinations end
June 1 (Mon.)	Summer engineering courses begin
June 3, 4 (Wed.-Thurs.)	Senior re-examinations
June 6 (Sat.)	Alumni Day and Class Day
June 7 (Sun.)	Baccalaureate Sunday
June 8 (Mon.)	University Day
June 8, 8:00 a.m. (Mon.)	Route surveying course begins
June 10, 11, 12, 13 (Wed.-Sat.)	Examinations for admission
June 20, 12 m. (Sat.)	Route surveying course ends
June 27 (Sat.)	Summer engineering courses end
June 29 (Mon.)	Summer session begins
Aug. 1 (Fri.)	Last day for filing applications for re-examinations
Aug. 8 (Sat.)	Summer session ends

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Term Expires

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UNIVERSITY FACULTY

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B.S., Southern Illinois Normal School, 1900; B.S. in C.E., Illinois, 1907; C.E., Colorado, 1909; LL.D. (Hon.), Lafayette, 1935; Eng.D. (Hon.), Northeastern, 1936; Eng.D. (Hon.), Bucknell, 1937; Sc.D. (Hon.), Hahnemann Medical College, 1938.

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M. E., Purdue, 1890; M.M.E., Cornell, 1895; Eng.D., Nebraska, 1920; LL.D. (Hon.), Lehigh, 1936.

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C.E., Vanderbilt, 1892. *Mathematics and Astronomy*

CHARLES LEWIS THORNBURG (1895, 1925).....*Professor Emeritus of*
Mathematics and Astronomy
B.S., Vanderbilt, 1881; B.E., 1882; C.E., 1883; Ph.D., 1884; LL.D. (Hon.), Lehigh, 1925

HARRY MAAS ULLMANN (1894, 1938).....*Professor Emeritus of Chemistry*
A.B., John Hopkins, 1889; Ph.D., 1892. *and Chemical Engineering*

PROFESSORS

ALLEN JENNINGS BARTHOLD (1939).....*Professor of Romance Languages,*
Head of the Department of Romance Languages
B.A., Lehigh, 1921; Ph.D., Yale, 1931.

PAUL LEVERNE BAYLEY (1927, 1937).....*Professor of Physics*
B.A., Arkansas, 1913; M.A., Illinois, 1914; Ph.D., Cornell, 1923.

CLAUDE GILLETTE BEARDSLEE (1931).....*Professor of Moral and*
Religious Philosophy, Head of the Department of Moral and Re-
ligious Philosophy, Chaplain of the University
B.A., Yale, 1909; B.D., Hartford Theological Seminary, 1912; S.T.M., 1913; M.A., Southern California, 1922; Ph.D., Brown, 1931.

JACOB LYNFORD BEAVER (1917, 1931).....*Professor of Electrical Engineering*
E.E., Lehigh, 1904; M.S., 1921; Sc.D., Harvard, 1932.

LOYAL VIVIEN BEWLEY (1940).....*Professor of Electrical Engineering,*
Head of the Department of Electrical Engineering, Director of
the Curriculum in Electrical Engineering
B.S. in E.E., Washington, 1923; M.S., Union College, 1928.

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Head of the Department of Physics, Director of the Curriculum in
Engineering Physics.
A.B., Rochester, 1904; Ph.D., Cornell, 1914.

FREDERICK ALDEN BRADFORD (1926, 1935).....*Professor of*
Economics, Head of the Department of Finance
A.B., Michigan, 1921; M.A., 1923; Ph.D., 1926.

LEHIGH UNIVERSITY

- SYDNEY MACGILLVARY BROWN (1922, 1931)..... *Professor of European History*
A.B., Bowdoin, 1916; B.A., Oxford; M.A., 1921.
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B.S., Colorado College, 1904; A.B., Kansas, 1906; M.D., Jefferson Medical College, 1909.
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M.E., Stevens Institute of Technology, 1895; C.E., Rensselaer Polytechnic, 1897.
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A.B., Michigan, 1916; M.A., 1918.
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B.S. in Chem., Lehigh, 1902; M.S., 1908.
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B.S., Lehigh, 1895; E.M., 1896.
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B.S., Parsons, 1912; M.S., Chicago, 1918; Ph.D., 1920.
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A.B., Michigan, 1920; A.M., 1923; Ph.D., 1926.
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Ph.B., Yale, 1895; B.A., Harvard, 1897; M.A., 1898; Ph.D., 1901.
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B.S., Purdue, 1930
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B.S., Wisconsin, 1906; M.E., 1915.
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B.Sc., Queen's, 1920; M.S., Lehigh, 1928.
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A.B., Bowdoin, 1921; M.A., Lehigh, 1935.

LEHIGH UNIVERSITY

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A.B., Amherst, 1908; A.M., Columbia, 1909; Ph.D., 1915.
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B.S. in M.E., Pennsylvania, 1909; M.E., 1924.
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Ch.E., Cincinnati, 1921; Ph.D., 1926.
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B.S., Colgate, 1920; Ed.M., Harvard, 1925; Ed.D., 1932.
- STANLEY JUDSON THOMAS (1923, 1928)..... *Professor of Bacteriology, Head of the Department of Biology*
B.S., Lafayette, 1912; M.S., Lehigh, 1913; M.A., 1916; Ph.D., Pennsylvania, 1928.
- BRADFORD WILLARD (1939)..... *Professor of Geology, Head of the Department of Geology*
B.A., Lehigh, 1921; A.M., Harvard, 1922; Ph.D., 1923.
- HORACE WETHERILL WRIGHT (1921, 1923)..... *Professor of Latin, Head of the Department of Latin*
A.B., Wisconsin, 1908; Ph.D., Pennsylvania, 1917

ASSOCIATE PROFESSORS

- CARL ELMER ALLEN (1930, 1939)..... *Associate Professor of Accounting*
B.S., Illinois, 1923; M.S., 1925; Ph.D., 1930; C.P.A., Pennsylvania, 1939.
- HAROLD VICTOR ANDERSON (1918, 1930)..... *Associate Professor of Chemistry*
B.Ch.E., Michigan, 1912; M.S., Lehigh, 1925.
- SYLVANUS A. BECKER (1906, 1922)..... *Associate Professor of Civil Engineering*
C.E., Lehigh, 1903; M.S., 1909.
- ROBERT DOMINICK BILLINGER (1929, 1939)..... *Associate Professor of Chemistry*
Ch.E., Lehigh, 1921; M.S., 1925; Ph.D., Cincinnati, 1929.
- WARD LESLIE BISHOP (1928, 1931)..... *Associate Professor of Economics*
A.B., Earlham, 1923; A.M., Illinois, 1924; Ph.D., 1928.
- ELMER CLARK BRATT (1929, 1938)..... *Associate Professor of Economics*
A.B., Nebraska, 1925; A.M., 1926; Ph.D., Wisconsin, 1935.
- PRESTON BANKS CARWILE (1927, 1931)..... *Associate Professor of Physics*
A.B. Davidson, 1920; M.A., Virginia, 1924; Ph.D., 1927.
- JOHN ROBERT CONNELLY (1929, 1938)..... *Associate Professor of Industrial Engineering*
B.S. in M.E., Illinois, 1927; M.S., 1929; M.A., Lehigh, 1934; M.E., Illinois, 1940.

FACULTY

- EARL LEVERNE CRUM (1929).....*Associate Professor of Classical Languages,
Head of the Department of Greek*
A.B., St. John's, (Annapolis), 1913; A.M., Johns Hopkins, 1916; Ph.D.,
New York, 1924.
- *MAURICE EWING (1930, 1940).....*Associate Professor of Geophysics*
B.A., Rice Institute, 1926; M.A., 1927; Ph.D., 1931.
- DONALD MCCOY FRASER (1931, 1939).....*Associate Professor of Geology*
A.B., Oregon, 1925; A.M., 1926; Ph.D., Columbia, 1930.
- AUGUSTUS HENRY FRETZ (1918, 1933).....*Associate Professor of Geology*
Ph.B., Lafayette, 1903; C.E., 1906; M.S., 1924.
- MERTON OTIS FULLER (1912, 1922).....*Associate Professor of Civil
Engineering*
C.E., Syracuse, 1910; M.S., Lehigh, 1934.
- WILSON LEON GODSHALL (1939, 1940).....*Associate Professor of
Diplomatic History and International Relations*
B.S., Pennsylvania, 1919; A.M., 1920, Ph.D., 1923.
- JAMES LAMOUR GRAHAM (1930, 1938).....*Associate Professor of
Psychology*
B.A., Muskingum, 1911; B.D., Union Theological Seminary, 1922; M.A.,
Columbia, 1922; Ph.D., Peabody, 1927.
- DALE HARTZLER GRAMLEY (1929, 1935).....*Associate Professor of
Journalism, University News Editor*
A.B., Albright, 1926; M.S., Columbia, 1929.
- GEORGE DEWEY HARMON (1925, 1931).....*Associate Professor of
American History*
B.A., Duke, 1921; M.A., 1922; Ph.D., Pennsylvania, 1930.
- THOMAS HUGER HAZLEHURST (1927, 1939).....*Associate Professor of
Chemistry*
A.B., College of Charleston, 1923; Ph.D., Johns Hopkins, 1927.
- NELSON SHERK HIBSHMAN (1924, 1933).....*Associate Professor of
Electrical Engineering*
B.S., Pennsylvania State College, 1924; M.S., Lehigh, 1927.
- GARTH AHYMAN HOWLAND (1927, 1933).....*Associate Professor of
Fine Arts, Head of the Department of Fine Arts*
B.A., North Dakota, 1912; M.A., Harvard, 1930.
- CYRIL DEWEY JENSEN (1925, 1937).....*Associate Professor of Civil
Engineering*
B.S. in C.E., Minnesota, 1921; C.E., 1930; M.S., Lehigh, 1929.
- HENRY CARL IVAR KNUTSON (1930, 1939).....*Associate Professor of
E.E., Brooklyn Polytechnic, 1929; M.E.E., 1931. Electrical Engineering*
- THEODORE THOMAS LAFFERTY (1930, 1937).....*Selfridge Associate
Professor of Philosophy, Associate Professor of Education*
A.B., Oklahoma City, 1924; M.A., Chicago, 1926; Ph.D., 1928.
- KENNETH WORCESTER LAMSON (1926, 1930).....*Associate Professor of
Mathematics*
A.B. Harvard, 1906; Ph.D., Chicago, 1917.
- CHARLES ROZIER LARKIN (1929, 1937).....*Associate Professor of Physics*
B.A., Virginia, 1923; M.A., 1925; Ph.D., 1929.

* Absent on leave 1940-1941.

LEHIGH UNIVERSITY

- ARCHIE ROSCOE MILLER (1922, 1938)..... *Associate Professor of*
B.S. in E.E., Illinois, 1918; M.S., Lehigh, 1925. *Electrical Engineering*
- ROBERT PATTISON MORE (1916, 1925)..... *Associate Professor of*
German, Executive Secretary of the Graduate Faculty
B.A., Lehigh, 1910; M.A., Harvard, 1913.
- GEORGE EMIL RAYNOR (1931, 1935)..... *Associate Professor of Mathematics*
B.S., Washington, 1918; M.A., Princeton, 1920; Ph.D., 1923
- EDGAR HEISLER RILEY (1926, 1931)..... *Associate Professor of English*
A.B., Cornell, 1915; Ph.D., 1925.
- ERNST BERNHARD SCHULZ (1927, 1931)..... *Associate Professor of*
B.S., Michigan, 1920; M.A., 1921; Ph.D., 1927. *Government*
- JONATHAN BURKE SEVERS (1927, 1936)..... *Associate Professor of English*
A.B., Rutgers, 1925; A.M., Princeton, 1927; Ph.D., Yale, 1935.
- CIARENCE ALBERT SHOOK (1930, 1935)..... *Associate Professor of*
Mathematics
A.B., Western Reserve, 1916; A.M., Harvard 1918; Ph.D., Johns Hop-
kins, 1923.
- ERIC SPENCER SINKINSON (1923, 1928)..... *Associate Professor of Ore*
Dressing and Fuel Technology
B.Sc., Sheffield, 1909; D.I.C., Imperial College of Science and Technology,
London, 1918; F.A.I.C.
- LAWRENCE WHITCOMB (1930, 1939)..... *Associate Professor of Geology*
Ph.B., Brown, 1922; A.M., Princeton, 1928; Ph.D., 1930.

ASSISTANT PROFESSORS

- WILLIAM MORTON BARROWS, JR. (1940)..... *Assistant Professor of Military*
Science and Tactics
B.A., 1929, Ohio State; M.Sc., 1931; Ph.D., 1934; Captain, U.S.A.
- FAY CONANT BARTLETT (1917, 1921)..... *Assistant Professor and Director*
of Physical Education
- FRANK SWAN BEALE (1930, 1935)..... *Assistant Professor of Mathematics*
B.S., Maine, 1921; M.S., 1923; Ph.D., Michigan, 1931.
- GEORGE CARLTON BECK (1904, 1913)..... *Assistant Professor of Quanti-*
A.C., Lehigh, 1903. *tative Analysis*
- FRANK CHESTER BECKER (1927, 1929)..... *Assistant Professor of Phil-*
osophy, Chairman of the Department of Philosophy
A.B., Wesleyan, 1905.
- CHARLES EDWARD BERGER (1929)..... *Assistant Professor of Physics*
B.S., Pennsylvania State College, 1916; Ph.D., Cornell, 1930.
- ADRIAN ROBERT BRIAN (1938)..... *Assistant Professor of*
A.B., Nebraska, 1917; Lt. Col., U.S.A. *Military Science and Tactics*
- CLEDO BRUNETTI (1937, 1939)..... *Assistant Professor of Electrical*
B.E.E., Minnesota, 1932; Ph.D., 1937. *Engineering*
- ROBERT DEXTER BUTLER (1936, 1939)..... *Assistant Professor of Geology*
S.B., Massachusetts Institute of Technology, 1932; Ph.D., 1936.

FACULTY

- JOSEPH CALVIN CALLAGHAN (1936, 1939).....*Assistant Professor of English and Speech*
A.B., Michigan, 1931; M.A., 1932.
- JAMES LOWRY CLIFFORD (1937, 1940).....*Assistant Professor of English*
A.B., Wabash College, 1923; B.S., Massachusetts Institute of Technology, 1925; A.M., Columbia, 1932.
- EDWARD HUTCHINS CUTLER (1930, 1940).....*Assistant Professor of Mathematics*
A.B., Harvard, 1925; A.M., 1926; Ph.D., 1930.
- WILLIAM JOSEPH ENEY (1936, 1938).....*Assistant Professor of Civil Engineering*
B.E., Johns Hopkins, 1927; M.S., Lehigh, 1938.
- AUSTIN ROGERS FREY (1929).....*Assistant Professor of Physics*
S.B., Harvard, 1920; M.A., 1924; Ph.D., 1929.
- JOHN H. FRYE (1935, 1940).....*Assistant Professor of Metallurgy*
A.B., Howard, 1930; M.S., Lehigh, 1934.
- HOWARD JOHNSON GODFREY (1937).....*Engineer of Tests*
B.S., Tufts College, 1931; M.S., Lehigh, 1933.
- HOWARD DIETRICH GRUBER (1914, 1918).....*Assistant Professor of Electrical Engineering*
E.E., Lehigh, 1909; M.S., 1923.
- ARTHUR THOMAS IPPEN (1938, 1939).....*Assistant Professor of Civil Engineering*
Dipl. Ing., Technische Hochschule, Aachen, Germany, 1931; M.S., California Institute of Technology, 1935; Ph.D., 1936.
- WILLIAM LEROY JENKINS (1935, 1939).....*Assistant Professor of Psychology*
B.S. in Chem., Brooklyn Polytechnic Institute, 1921; M.A., Michigan, 1932; Ph.D. 1936.
- BRUCE GILBERT JOHNSTON (1938).....*Assistant Professor of Civil Engineering, Assistant Director of Fritz Laboratory*
B.S. in C.E., Illinois, 1930; M.S., Lehigh, 1934; Ph.D., Columbia, 1938.
- THOMAS FREDERICK JONES (1939).....*Assistant Professor of Economics*
B.S. Ohio State, 1933; M.S., Columbia, 1934.
- VORIS V. LATSHAW (1931, 1938).....*Assistant Professor of Mathematics*
B.A. Indiana, 1927; A.M., 1928; Ph.D., 1930.
- ROBERT WALLACE MAYER (1933, 1938).....*Assistant Professor of Economics*
B.S., Illinois, 1930; M.S., 1931; Ph.D., 1933.
- HARRY GORDON PAYROW (1916, 1919).....*Assistant Professor of Sanitary Engineering*
B.S. in C.E., Tufts, 1907.
- CHARLES EDGAR PHILLIPS (1940).....*Assistant Professor of Military Science and Tactics*
A.B., Pennsylvania State College, 1933; Captain, U.S.A.
- ARTHUR EVERETT PITCHER (1938, 1939).....*Assistant Professor of Mathematics*
A.B., Western Reserve, 1932; A.M., Harvard, 1933; Ph.D., 1935.
- JOHN GRIFFITH ROBERTS (1937, 1939).....*Assistant Professor of Romance Languages*
A.B., Randolph-Macon, 1922; A.M., Harvard, 1925; Ph.D., 1935.
- RAYMOND FREDERICK SCHULTZ (1937, 1939).....*Assistant Professor of Chemistry*
B.S., Wisconsin, 1930; M.A., Harvard, 1932; Ph.D. 1934.
- JOHN FRANCIS SCHWARTZ (1940).....*Assistant Professor of Military Science and Tactics*
B.S. in C.E., Lehigh, 1932; Captain, U.S.A.

LEHIGH UNIVERSITY

- FREDERIC ALLEN SCOTT (1935, 1939).....*Assistant Professor of Physics*
B.S., New York State College for Teachers, 1924; M.S., Lehigh, 1929;
Ph.D., Rice Institute, 1935.
- CHARLES AUGUSTUS SEIDLE (1938).....*Assistant Director of Admissions*
B.A., Pittsburgh, 1931; M.A., Columbia, 1936 .
- EARL JAMES SERFASS (1936, 1940)..... *Assistant Professor of Chemistry*
B.S. in Ch.E., Lehigh, 1933; M.S., 1935; Ph.D., 1938.
- EUGENE HULSE SLOANE (1928, 1938)..... *Assistant Professor of English*
A.B., Ohio State, 1925, A.M., 1926; Ph.D., Pennsylvania, 1938.
- HILTON ALBERT SMITH (1935, 1939).....*Assistant Professor of Chemistry*
A.B., Oberlin, 1930; A.M., Harvard, 1932; Ph.D., 1934.
- JUDSON GRAY SMULL (1919, 1938)..... *Assistant Professor of Chemistry*
B.S. in Chem., Lehigh, 1906; M.S., 1921.
- BENJAMIN LICHTY SNAVELY (1931, 1938)....*Assistant Professor of Physics*
B.S. in Eng. Phys., Lehigh, 1928; Ph.D., Princeton, 1935.
- RAFAEL ARCANGEL SOTO (1925, 1928).....*Assistant Professor of Romance*
B.S., Illinois, 1912; B.A., 1915; M.A., 1917. *Languages*
- FRANCIS JOHN TREMBLEY (1928, 1938)....*Assistant Professor of Biology*
B.S., Hobart College, 1928; M.S., Lehigh, 1931; Ph.D., Pennsylvania,
1940.
- JOHN SCHRADER TREMPER (1939)..... *Assistant Professor of German*
A.B., Colgate, 1928; M.A., Cornell, 1932; Ph.D., 1938.
- EUGENE HENRY UHLER (1919, 1921).....*Assistant Professor of Civil*
C.E., Lafayette, 1908. *Engineering*
- RAYMOND HARRY WHITE (1937).....*Assistant Professor of Education*
B.S. in Ed., Southwest Missouri State Teachers College, 1918; A.B.,
Drury College, 1919; A.M., Chicago, 1924; Ed.D., Columbia, 1936.

LECTURERS

- CHARLES AUSTIN BUCK (1933).....*Lecturer on Procurement of Raw*
B.S. in Chem., Lehigh, 1887; Eng.D. (Hon.), 1930. *Materials*
- NICHOLAS HUNTER HECK (1937).....*Lecturer on Geophysics*
B.A., Lehigh, 1903; C.E., 1904; Sc.D. (Hon.), 1930.
- HARRY FREDERICK HOFFMAN (1922)..... *Lecturer on Mental Hygiene*
M.D., Hahnemann Medical College, 1910.
- HENRY I. KLOPP (1927).....*Lecturer on Mental Hygiene*
M.D., Hahnemann Medical College, 1894; Sc.D., (Hon.), Muhlenberg
College, 1927.
- ROY A. LEWIS (1924).....*Lecturer on Plant Management*
M.E.
- ROBERT EDWARD LARAMY (1940).....*Lecturer on Education*
B.A., Lehigh, 1896; M.A., 1899.
- EDWIN JAY PRINDLE (1924)..... *Lecturer on Patent Law*
M.E., Lehigh, 1890; LL.B., National, 1892; LL.M., 1894; L.L.D., 1930;
Eng.D. (Hon.), 1933.

FACULTY

INSTRUCTORS

- EDWARD DELBERT AMSTUTZ (1938).....*Instructor in Chemistry*
B.S., College of Wooster, 1930; M.S., Institute of Paper Chemistry, 1932;
Ph.D., Cornell, 1936.
- JOEL FURNESS BAILEY (1939).....*Instructor in Mechanical Engineering*
B.S. in M.E., Purdue, 1935; M.S., Lehigh, 1939.
- PAUL ROBERT CALVERT (1933).....*Instructor in Physical Education*
B.P.E., Purdue, 1932.
- JAMES DUNCAN CAMPBELL (1940).....*Instructor in Military Science and Tactics*
A.B., Gettysburg College, 1937; Lieutenant, U.S.A.
- GLENN JAMES CHRISTENSEN (1939).....*Instructor in English*
B.A., College of Wooster, 1935; Ph.D., Yale, 1939.
- CLARENCE DANHOF (1937).....*Instructor in Economics*
A.B., Kalamazoo College, 1932; M.A., Michigan, 1933; Ph.D., 1939.
- JAMES VANDEUSEN EPPES (1940).....*Instructor in Mechanical Engineering*
B.A., University of Virginia, 1928; M.E., Cornell, 1931.
- GEORGE DORMER FARNÉ (1934).....*Instructor in Romance Languages*
A.B., Columbia College, 1926; M.A., Columbia, 1927.
- FRANK JUNIOR FORNOFF (1940).....*Instructor in Chemistry*
A.B., University of Illinois, 1936; M.Sc., Ohio State, 1937; Ph.D., 1939.
- WALTON FORSTALL, JR. (1940).....*Instructor in Mechanical Engineering*
B.S. in M.E., Lehigh, 1931.
- THOMAS TIMINGS HOLME (1937).....*Instructor in Mechanical Engineering*
B.S. in M.E., Lehigh, 1935; M.S., 1940.
- THOMAS EDGAR JACKSON (1937).....*Instructor in Mechanical Engineering*
B.S. in M.E., Carnegie Institute of Technology, 1934; M.S., Lehigh, 1937.
- MORRIS EUGENE KANALY (1919, 1921).....*Instructor in Physical Education*
- KENNETH KARL KOST (1931, 1936).....*Instructor in Journalism*
B.A., Lehigh, 1931.
- HENRY AUGUST KREIBEL (1939).....*Instructor in Accounting*
B.S. in Bus. Adm., Lehigh, 1932; M.A., 1937.
- INGVALD ELIAS MADSEN (1939).....*Assistant Research Engineer*
S.B. in C.E., Massachusetts Institute of Technology, 1933; M.S., Lehigh, 1936.
- WILLIAM ANDREW McDONALD (1939).....*Instructor in Latin*
B.A., Toronto, 1935; M.A., 1936; Ph.D., Johns Hopkins, 1940.
- GORDON WELLS MCKINLEY (1940).....*Instructor in Economics*
A.B., Mc Master, 1938; M.A., Ohio State, 1940.
- ROBERT FRANCIS MCNERNEY, JR. (1939).....*Instructor in Romance Languages*
Ph.B., Yale, 1929; Ph.D., 1937.
- JOHN CLEWELL MERTZ (1936).....*Instructor in Chemistry*
B.S. in Ch.E., Lehigh, 1931; Ph.D., Yale, 1936.
- DOUGLAS EWART MODE (1940).....*Instructor in Electrical Engineering*
B.S. in E.E., Pennsylvania, 1935; M.S., 1940.

- BASIL WALDO PARKER (1940)..... *Instructor in Biology*
S.B., Massachusetts Institute of Technology, 1933; Ph.D., 1939; A.M.
Harvard, 1935.
- DONALD THEODORE PERKINS (1940)..... *Instructor in Mathematics*
A.B., Syracuse, 1935; Ph.D., Yale, 1938.
- SAMUEL PIERCE, JR. (1940)..... *Instructor in Military Science and Tactics*
B.S. in Economics, University of Vermont, 1934; Lieutenant, U.S.A.
- ALBERT AUGUSTUS RIGHTS (1933)..... *Instructor in English and Speech*
A.B., Maine, 1927; A.M., Harvard, 1931.
- DAVID GALLUP SCOTT (1927)..... *Instructor in Romance Languages*
B.A., Princeton, 1925; M.A., Yale 1926.
- JAMES PLATTENBERGER SELL (1934, 1937)..... *Instructor in Biology*
B.A., Oberlin, 1931; M.S., Lehigh, 1937.
- WILLIAM SHERIDAN (1911)..... *Instructor in Physical Education*
- PAUL EDWARD SHORT (1938)..... *Assistant Director of Athletics, Instructor*
B.S. in Bus. Adm., Lehigh, 1934. *in Physical Education*
- MALCOLM FINLAY SMILEY (1938)..... *Instructor in Mathematics*
S.B., Chicago, 1934; Ph.D., 1937.
- ROBERT DANIEL STOUT (1939)..... *Instructor in Metallurgical*
B.S., Pennsylvania State College, 1935. *Engineering*
- CARL FERDINAND STRAUCH (1939)..... *Instructor in English*
A.B., Muhlenberg College, 1930; M.A., Lehigh, 1934.
- LOUIS REED TRIPP (1939)..... *Instructor in Economics*
A.B., Union College, 1934.
- RALPH NEWCOMB VANARNAM (1928, 1930)..... *Instructor in Mathematics*
E.E., Cornell, 1926; M.S., 1927. *and Astronomy*
- JOHN LIVEZEY VANDERSLICE (1935)..... *Instructor in Mathematics*
B.S. in E.E., Pennsylvania, 1928; A.M., 1930; Ph.D., Princeton, 1934.
- CECIL FRANCIS WARNER (1940)..... *Instructor in Mechanical*
B.S. in M.E. Purdue, 1939. *Engineering*
- MARTIN BRUCE WESTERMAN (1935)..... *Instructor in Physical Education*

ASSISTANTS

- BERNARD ALTSHULER (1940)..... *Graduate Assistant in Physics*
B.S. in Eng. Phys., Lehigh, 1940.
- CARL DANIEL BAUMANN (1939)..... *Graduate Assistant in Physics*
B.S., Albright College, 1939.
- JOHN FRANKLIN BECK (1939)..... *Assistant in Military Science and*
Sergt., U.S.A. *Tactics*
- ROBERT AUGUST BUERSCHAPER (1939)..... *Graduate Assistant in Physics*
B.S. in Eng. Phys., Lehigh, 1937; M.S., 1940.
- LEONARD PATILLO BURTON (1940)..... *Graduate Assistant in Mathematics*
A.B., University of Alabama, 1939; M.A., 1940.
- JOHN HARRY CARPENTER (1921)..... *Assistant in Physical Education*

FACULTY

- THOMAS H. DUBY (1933).....*Assistant in Military Science and Tactics*
Staff Sergt., D.E.M.L., U.S.A.
- GEORGE FRANCIS GASDA (1928)..*Assistant in Military Science and Tactics*
Tech. Sergt., D.E.M.L., U.S.A.
- ROGER SHINKLE HAWLEY (1940).....*Graduate Assistant in Chemistry*
B.S. in Ch.E., Indiana Technical College, 1935; A.B., Earlham, 1938.
- EARL HEINS (1939).....*Graduate Assistant in Chemistry*
B.S. in Ch.E., Lehigh, 1939.
- KENNETH BAKER HORNING (1938, 1940).....*Assistant in English*
B.S. Illinois, 1938; M.A., Lehigh 1940. *and Speech*
- EVERETT LEE JONES (1940).....*Graduate Assistant in English*
A.B., Antioch College, 1938.
- JOSEPH ADREON KELLER, JR. (1939).....*Graduate Assistant in*
Mechanical Engineering
B.S. in M.E., Georgia School of Technology, 1939.
- WILLIAM STANLEY LANTERMAN, JR. (1937)..... *Graduate Assistant*
B.S., Lafayette, 1935; M.S., 1937. *in Physics*
- HAROLD SAMUEL LEVENSON (1937)..... *Graduate Assistant in Chemistry*
B.S. in Ch.E., Lehigh, 1937; M.S., 1939.
- JAMES JOHN MAHONEY (1927)..... *Assistant in Swimming*
- WILLIAM DONALD MCCAAG (1939).....*Assistant Football Coach*
B.S. in Bus. Adm., Lehigh, 1936.
- WILLIAM ANTHONY MCGRATH (1940).....*Graduate Assistant in*
B.S. in Ch.E., Northeastern, 1939. *Chemical Engineering*
- FREDERIC MERCUR (1935).....*Assistant in Physical Education*
- CHARLES JOHN MORAVEC (1937).....*Assistant in Journalism, Assistant*
B.S., Albright, 1937. *University News Editor*
- PETER JOHN MORRISSEY (1933).....*Assistant in Physical Education*
- OTAKAR ONDRA (1940).....*Assistant in Civil Engineering*
Technical University of Prague, Dipl. Ing. in C.E., 1938; M.S., Lehigh,
1940.
- EUGENE PARK (1939).....*Graduate Assistant in Mathematics*
A.B., Georgia, 1939.
- CHESTER HOWARD POWERS (1940).....*Graduate Assistant in*
Mechanical Engineering
B.S., Davis Elkins, 1934; B.S. in M.E., Purdue, 1940.
- CHARLES HENRY REICHARDT (1939).....*Graduate Assistant in Chemistry*
B.S. in Chem., Rutgers, 1939.
- KENNETH BERLIN SHIFFERT (1938).....*Graduate Assistant in Physics*
B.S., Muhlenberg, 1934; M.S., Lehigh, 1938.
- WILLIAM AUGUST STAUTH (1939).....*Assistant in Ore Dressing*
B.A., Lehigh, 1939. *and Fuel Technology*
- JAMES HARVEY STEELE (1939).....*Graduate Assistant in Chemistry*
A.B., Bethany College, 1939.

LEHIGH UNIVERSITY

ROLLASTON GEORGE STILES (1938)	Graduate Assistant in Physics
B.S. in E.E., Vermont, 1936; M.S., 1938.	
PAUL THEODORE WEINERT STRUB (1940)	Graduate Assistant in Chemistry
B.S. in Ch.E., Bucknell, 1939.	
WILLIAM BURTON TODD (1940)	Graduate Assistant in English
B.A., Lehigh, 1940.	
WILLIAM REAGLE TRANSUE (1937)	Assistant in Mathematics
B.S., Lafayette, 1935; M.A., Lehigh, 1939.	
LOUIS ADDISON WATERS (1940)	Graduate Assistant in English
A.B., Harvard, 1940.	
DAVID ROWLEY WILLIAMS (1940)	Graduate Assistant in Mechanical Engineering
B.S. in M.E., Drexel, 1940.	

FELLOWS

WILLIAM ADRIAN BLUM, JR. (1940)	National Oil Products Company Fellow
B.S. in Ch.E., Lehigh, 1940.	
JOHN BRANCH (1940)	Heat Exchange Institute Research Fellow
B.S. in Ch.E., Lehigh, 1940.	
JESSE WILBUR CAUM (1940)	John H. Frye Fellow in Metallurgy
B.S. Pennsylvania State College, 1940.	
BENJAMIN KECK DAUBENSPECK (1939)	William L. Heim Fellow in Chemistry
B.S. in Ch.E., Lehigh, 1937.	
GORDON ROBERT DEITS (1940)	American Welding Society Research Fellow in Civil Engineering
B.S. in C.E., University of Washington, 1939.	
LOUIS MERRILL FERENCZI (1939)	H. M. Byllesby Research Fellow in Mechanical Engineering
B.S. in M.E., Lehigh, 1939.	
EUGENE ROBERT LAWRENCE GAUGHRAN (1940)	Katherine Comstock Thorne Fellow in Biology
B.A., Lehigh, 1939.	
JOHN GIACOBBE (1940)	Silver Research Committee Fellow in Metallurgy
B.S. in Ch.E., Lehigh, 1940.	
LLOYD FRANK GREEN (1939)	Garrett Linderman Hoppes Research Fellow in Civil Engineering
B.S. in C.E., Case, 1939.	
MAURICE LEIGHTON GREENOUGH	H. M. Byllesby Research Fellow in Electrical Engineering
B.S. in E.E., Tufts, 1940.	
THOMAS GARDE HARRIS (1937)	Devoe and Reynolds Company Research Fellow in Chemistry
B.S. in Ch.E., Lehigh, 1937; M.S., 1939.	
ROBERT AARON HECHTMAN (1939)	American Institute of Steel Construction Research Fellow in Civil Engineering
B.S. in C.E., University of Washington, 1938; M.S., 1939.	
THOMAS FRANKLIN JACOBY (1938)	R. K. Laros Silk Company Research Fellow
B.S. in Ch.E., Lehigh, 1938.	
GERALD GIRO KUBO (1940)	American Institute of Steel Construction Research Fellow in Civil Engineering
B.S. in C.E., University of Washington, 1938; M.S., Massachusetts Institute of Technology, 1939.	

FACULTY

- WILLIAM JOSEPH KUHNS (1940)..... *Institute of Research Fellow*
 B.S., Muhlenberg College, 1940. *in Bacteriology*
- WILLIAM KEDDIE MEERBOTT (1940)..... *Mutual Chemical Company of*
 B.S., St. Peter's College, 1940. *America Fellow*
- GERALD GORDON MURPHY (1940)..... *H. M. Byllesby Fellow in*
 B.S. in E.E. *Electrical Engineering*
- FRANCIS OPILA (1940)..... *Lawrence Calvin Brink Research Fellow*
 B.S. in C.E., Armour Institute of Technology, 1940. *in Civil Engineering*
- HERBERT EMIL RASMUSSEN..... *Student Chemistry Foundation*
 B.S., in Ch.E., Lehigh, 1940. *Fellow*
- MILLARD O'NEAL RICKER (1939)..... *Seton Leather Company Research*
 B.S. in Ch.E., Northeastern, 1939. *Fellow in Chemistry*
- GARN ARTHUR RYNEARSON (1939)..... *New Jersey Zinc Company*
Research Fellow in Geology
 B.S., California Institute of Technology, 1938.
- LOWRIE BARNETT SARGENT, JR. (1940)..... *Raybestos-Manhattan Research*
 B.S., Washington and Jefferson, 1940. *Fellow*
- ELMER GOULD SMITH (1940)..... *Institute of Research Fellow*
 B.A., Lehigh, 1940. *in Bacteriology*
- GERALD CLAIR SNYDER (1940)..... *Corn Products Refining Company*
 B.S., Muhlenberg, 1940. *Research Fellow*
- HARRY ALFRED STRAUSS, JR. (1940)..... *Fellow in Remedial Education*
 B.S., Muhlenberg, 1940.

SUMMER SCHOOL

(In addition to members of the regular staff)

- WILLIAM L. CONNOR (1938)..... *Superintendent of Schools, Allentown*
 A.B., Indiana State Teachers College, 1914; A.M., Columbia, 1924.
- ROBERT EDWARD LARAMY (1940)..... *Formerly Superintendent of*
 B.A., Lehigh, 1896; M.A., 1899. *Schools, Altoona, Pa.*

STANDING COMMITTEES OF THE FACULTY

(The term of each member expires in June of the year given in parentheses after his name. The President is ex officio a member of all committees)

ADMISSIONS: Director of Admissions Smiley (*ex officio*), Dean Congdon (*ex officio*), Registrar Curtis (*ex officio*), Professors A. R. Miller (1941), Diamond (1942), Lafferty (1943), Shook (1944), Frey (1945), Anderson (1946), H. P. Thomas (1947).

ADVANCED STANDING: Registrar Curtis (*ex officio*), Director of Admissions Smiley (*ex officio*), Professors Bratt (1941), Graham (1942), Hibshman (1943), Sinkinson (1944).

DISCIPLINE: Dean Congdon (*ex officio*), Professors Fraser (1941), Beaver (1942), Reynolds (1943), and one student member: A. E. Lee.

EDUCATIONAL POLICY: Professors Stoughton (1941), F. V. Larkin (1942), Diamond (1943), Dean Congdon (*ex officio*), Stuart (1944), Schulz (1945).

HONORARY DEGREES: Professors Bidwell (1941), Palmer (1942), Diamond (1943), Doan (1944), B. L. Miller (1945), Neville (1946).

HOUSE COMMITTEE, DROWN MEMORIAL HALL: Professor Beardslee and two student members: C. K. Kiefer, F. R. Gilmore.

INSPECTION TRIPS: Professors Butterfield (1941), Butts (1942), Bilingier (1943), Jensen (1944), Payrow (1945).

PETITIONS: Registrar Curtis (*ex officio*), Professors Allen (1941), F. C. Becker (1942), Simmons (1943), Hibshman (1944).

PUBLICATIONS, BOARD OF: Dean Congdon (*ex officio*), Professors Gramley (*ex officio*), Howland (1941), Kost, Secretary, and three student members: R. M. Ulmer, R. M. Shepherd, J. C. Atwood.

ROSTER: Registrar Curtis (*ex officio*), Professors Carwile (1941), Beck (1942), Payrow (1943), Bishop (1944).

STANDING OF STUDENTS: Deans Congdon, Palmer, Carothers, Callen; Professors Bewley, Bidwell, Doan, F. V. Larkin, Neville, Sutherland; Registrar Curtis (all members *ex officio*).

STUDENT ACTIVITIES: Dean Congdon (*ex officio*), Professors Harmon (1941), Roberts (1942), and three student members, G. J. Gabuzda, Jr., W. H. Vogelsberg, D. R. Schoen.

STUDENT CLUB FINANCES: Dean Congdon (*ex officio*), Professors Petersen (1941), Cowin (1942), and three student members: R. S. Zachary, W. E. Scott, A. A. Riemondy.

SUMMER SESSION: Professors H. P. Thomas (*ex officio*), Bradford (1941), Riley (1942), Lafferty (1943), Bishop (1944), Gramley (1945).

SPECIAL COMMITTEE OF THE FACULTY

FACULTY EDUCATIONAL CLUB: Professor Hughes, Chairman; Professor R. W. Mayer, Secretary; Professors F. C. Becker, Ford, White, and Callaghan (each member is elected for the period of one year).

ADMINISTRATION

Office of the President

CLEMENT CLARENCE WILLIAMS, B.S., B.S. in C.E., C.E., LL.D., Eng.D.,
Sc.D., *President*
JOHN IRVINE KIRKPATRICK, B.S. in BUS. AD., *Assistant to the President*
HELEN GENEVIEVE RYAN, *Secretary to the President*

Office of the Vice-president and Treasurer

WALTER RALEIGH OKESON, C.E., *Vice-president and Treasurer*
FREDERICK RALPH ASHBAUGH, *Bursar and Purchasing Agent*
MELVIN SCHISSLER, C.P.A., *Auditor*
JOHN WALTER MAXWELL, JR., B.S. in BUS. AD., *Manager of Supply
Bureau*
EDWARD A. HOWER, *Manager of Realty, Brodhead Estate*
EDNA VIRGINIA DEAN, *Secretary to the Treasurer*

Office of the Dean of Undergraduates

WRAY HOLLOWELL CONGDON, A.B., M.A., PH.D., *Dean of Under-
graduates*

Office of the Registrar

GEORGE BARTLETT CURTIS, A.B., A.M., *Registrar and University Editor*
JAMES LAMBERSON SHEARER, B.A., *Assistant to the Registrar*
JEANETTE IDA CLEAVELAND, *Recorder*
LEANOR RUTH GILBERT, *Assistant Recorder*

Office of the Director of Admissions

EARL KENNETH SMILEY, A.B., M.A., *Director*
CHARLES AUGUSTUS SEIDLE, B.A., M.A., *Assistant Director*

Deans of Divisions

PHILIP MASON PALMER, A.B., *Dean of the College of Arts and Science*
NEIL CAROTHERS, B.A., DIP. IN ECON., PH.D., *Dean of the College of
Business Administration*
ALFRED COPELAND CALLEN, E.M., M.S., *Dean of the College of Engi-
neering*
TOMLINSON FORT, A.B., A.M., PH.D., *Dean of the Graduate School*

Directors of Curricula

PHILIP MASON PALMER, A.B., *Arts and Science*
NEIL CAROTHERS, B.A., DIP. IN ECON., PH.D., *Business Administration*
HARVEY ALEXANDER NEVILLE, A.B., M.A., PH.D., *Chemistry and Chem-
ical Engineering*
HALE SUTHERLAND, A.B., S.B., *Civil Engineering*
LOYAL VIVIEN BEWLEY, B.S. in E.E., M.S., *Electrical Engineering*
CHARLES CLARENCE BIDWELL, A.B., PH.D., *Engineering Physics*
FRED VIAL LARKIN, B.S. M.E., *Mechanical Engineering and Industrial
Engineering*
GILBERT EVERETT DOAN, CH.E., PH.D., *Metallurgical Engineering*
ALFRED COPELAND CALLEN, E.M., M.S., *Mining Engineering*

Summer Session

HAROLD PRESCOTT THOMAS, B.S., ED.M., ED.D., *Director*

Faculty

GEORGE BARTLETT CURTIS, A.B., A.M., *Secretary*

Legal Counsel

ROBERT SAYRE TAYLOR, B.S., LL.B., *Legal Counsel*

Linderman Memorial Library

HOWARD SEAVOY LEACH, A.B., M.A., *Librarian*

MARY ELIZA WHEATLEY, A.B., A.M., *Head Cataloguer*

MYRTLE HELMS EASTON, A.B., B.S. IN L.S., *Circulation Desk Attendant*

JEAN ELIZABETH RIEGEL, B.A., B.S. IN L.S., *Assistant Desk Attendant*

MURIEL LOUISE KEMP, B.S., *Assistant Cataloguer*

RUTH LOIS HALL, B.A., B.S. IN L.S., *Assistant Cataloguer*

Packer Memorial Church

THE REV. CLAUDE GILLETTE BEARDSLEE, B.A., B.D., M.A., S.T.M.,
Ph.D., *Chaplain*

THOMAS EDGAR SHIELDS, MUS.D., A.A.G.O., *Organist*

The Fritz Engineering Laboratory

HALE SUTHERLAND, A.B., S.B., *Director*

BRUCE GILBERT JOHNSTON, B.S. IN C.E., M.S., Ph.D., *Assistant Director*

Students' Health Service

RAYMOND COOLEY BULL, B.S., A.B., M.D., *Director*

CARL OTTO KECK, M.D., *Assistant Director*

MRS. JENNIE VYE DACEY, R.N., *Nurse in charge of Dispensary*

HARRY FREDERICK HOFFMAN, M.D., *Consultant in Mental Hygiene*

WILLIAM MICHAEL BURKHARDT, *Masseur*

Division of Intercollegiate Athletics

GLEN WALTER HARMESON, B.S., *Director*

PAUL EDWARD SHORT, B.S. IN BUS. AD., *Assistant Director of Athletics
and Business Manager*

University Band

THOMAS EDGAR SHIELDS, MUS.D., A.A.G.O., *Director*

University News Service

DALE HARTZLER GRAMLEY, A.B., M.S., *University News Editor*

CHARLES JOHN MORAVEC, B.S., *Assistant University News Editor*

Placement Bureau

ELIAS ROBINS MORGAN, M.E., *Director*

Department of Buildings and Grounds

ANDREW WILLARD LITZENBERGER, *Superintendent of Buildings and
Grounds*

JOHN DAVID HARTIGAN, *Superintendent of the Power Plant*

STANLEY HARRISON PETERS, *General Foreman*

Consulting Architects

VISSCHER AND BURLEY, New York, N.Y.

Alumni Association

ROBERT FORD HERRICK, B.A., *Acting Secretary and Editor of the Lehigh Alumni Bulletin*

Special Standing Committees

ADVISORY COUNCIL ON GENERAL EDUCATION: Professors Diamond, Executive Chairman, Beardslee, Secretary, F. C. Becker, Doan, Hughes, Neville, Palmer, Shook, Smith, Sutherland, Butts, Crum, Gipson, Hazlehurst, Sloane, Trembley, Whitcomb.

ART EXHIBITIONS: Professors Palmer, Howland, Petersen, Librarian Leach.

ATHLETIC ELIGIBILITY: Professors Harmeson (*ex officio*), S. A. Becker (1941), Connelly (1942), Billinger (1943), Beaver (1944).

"BOSEY REITER CUP" COMMITTEE: Dean Congdon, Dr. Beardslee, Professor Reiter.

CHAPEL: Professors Beardslee, Shields, Reynolds, Stoughton, Beaver.

EXECUTIVE COMMITTEE OF THE GRADUATE FACULTY: President Williams, Dean Fort (*ex officio*), Professors More (*ex officio*) Diamond (1942), Bidwell (1943), Neville (1944), Doan (1945), Willard (1946).

INSTITUTE OF RESEARCH: President Williams, Deans Fort, Carothers, Callen, Palmer, University Editor Curtis (*ex officio*); Professors Sutherland, F. V. Larkin, Bidwell, Gipson, S. J. Thomas, Willard, Doan, Neville, Ford, Bewley.

LECTURES: Professors Barthold (1941), Hibshman (1941), Bradford (1942), Bayley (1942), Petersen (1943), Registrar Curtis (1943).

LIBRARY: Librarian Leach (*ex officio*), Professors Diamond (1941), Stuart (1942), Simmons (1943), C. R. Larkin (1944), Severs (1945).

MUSIC: Professors Shields, Palmer, Beardslee, Registrar Curtis.

PROFESSIONAL ENGINEERING DEGREES: Professors F. V. Larkin, Sutherland, Callen, Doan, Bewley.

REGISTER: Registrar Curtis, Director of Admissions Smiley, Professors Smith, Cowin.

SCHOLARSHIPS AND LOANS: Dean Congdon, Treasurer Okeson, Director of Admissions Smiley.

STUDENT CONCERTS—LECTURES SERIES, FACULTY ADVISORY COMMITTEE ON: Registrar Curtis, Professors Shields, Shook.

TEACHER PLACEMENT: Professors H. P. Thomas, Hughes, Dean Congdon, Dean Palmer, Mr. Morgan.

WILLIAMS SENIOR PRIZES: Professors Smith, Palmer, Hughes, Carothers, Ford, Gipson.

HISTORY

Lehigh University was chartered by the Legislature of Pennsylvania by an act dated February 9, 1866. In 1865 the Hon. Asa Packer, of Mauch Chunk, inaugurated a movement to provide an institution that would afford training and education in the learned professions as then recognized, and in technical branches, the importance of which was then just becoming apparent in the development of the industrial and transportation interests of the country. He made an initial donation of a large tract of land for this purpose and the sum of \$500,000.00 to which he added largely during his lifetime and by his will.

Since its foundation the equipment and resources of the University have steadily increased through the continued interest of the university's trustees, alumni, and friends. The University now occupies twenty buildings and its grounds cover one hundred and eighty acres on the north side of South Mountain, overlooking the valley of the Lehigh River and the city of Bethlehem. The present endowment totals \$8,000,000.00.

REQUIREMENTS FOR ADMISSION

The enrollment of Lehigh University is strictly limited by action of its board of trustees, with a resulting limitation in the number of candidates who can be admitted each year in the several divisions of the University. Women are not admitted as undergraduates or as special students except in the summer session.

In the selective procedure necessitated by this limitation, the University, through its office of admissions, takes into account a number of criteria, which are believed to have some individual validity, and in combination a high degree of validity, in predicting probable success in college work. The object is to select those candidates who are most likely to profit fully by the programs offered at this University.

The criteria considered include:

- I. Certain quantitative subject-matter requirements.
- II. The quality of the individual student's work in the secondary school.

III. Such qualifications as sound health, emotional stability, intellectual motivation, and established habits of industry and regularity.

IV. The candidate's showing in a scholastic aptitude test and other tests, in cases where such tests are prescribed by the University.

I. QUANTITATIVE SUBJECT-MATTER REQUIREMENTS

All candidates must offer fifteen units of entrance credit, by certificate from an accredited school, or by examination, or by a combination of these methods.* The fifteen units represent the quantitative equivalent of the usual four-year high school or preparatory school course.

Certificates of the College Entrance Examination Board may be accepted in subjects in which the recorded score is satisfactory. These examinations are held in April, in June, and in September of each year. Information in regard to these examinations, application blanks, and a circular (thirty cents per copy) giving detailed definitions of the requirements in each subject may be obtained from the College Entrance Examination Board, 431 West 117th Street, New York, N. Y.

PREScribed SUBJECTS

The fifteen units must include certain prescribed subjects, together with sufficient electives to make up the required total. The only subjects prescribed are those which are essential prerequisites for college courses which the student should take in his first year in the University.

For the several colleges within the University, the prescribed subjects and the number of electives are as follows:

For the College of Arts and Science—

	Units *
English	3
Foreign language (ordinarily Latin or German or French or Spanish).....	2
Elementary and Intermediate Algebra.....	1½
Plane Geometry	1
Electives	7½
	15

* A unit represents a year's study in a single subject in a secondary school, comprising the work of 180 recitation periods (5 periods a week for 36 weeks) of 40 minutes each or the equivalent.

For the College of Business Administration—

	Units *
English	3
Elementary and Intermediate Algebra.....	1½
Plane Geometry	1
Electives	9½
	15

For the College of Engineering—

	Units *
English	3
Elementary and Intermediate Algebra.....	1½
Plane Geometry	1
Plane Trigonometry and Logarithms.....	½
Solid Geometry or Advanced Algebra.....	½
Electives	8½
	15

ELECTIVES

The electives may be offered in any subject studied under standard conditions in an accredited high school or preparatory school. In general, electives in the fields of foreign language, mathematics, history, and science are preferred, but in the case of a superior student the requirements as to electives may be satisfied in whole or in part by courses in commercial subjects, manual arts, or fine arts.

It should be understood, however, that meeting in full the foregoing subject requirements does not insure admission, but insures only eligibility for consideration in the light of remaining criteria.

II. THE CRITERION OF QUALITY

The quality of the student's work will be judged primarily by his rank or relative average grade in his class. Consideration will be given also to the extent to which he has made grades distinctly higher than the passing grade; to evidence of improvement or deterioration in quality in the course of his progress through the secondary school; to his relative success or failure in the particular subjects which he proposes to continue in college; and to the comments and recommendations of his principal or headmaster.

* A unit represents a year's study in a single subject in a secondary school, comprising the work of 180 recitation periods (5 periods a week for 36 weeks) of 40 minutes each or the equivalent.

III. OTHER QUALIFICATIONS

Information with respect to the other qualifications considered, including sound health, emotional stability, intellectual motivation, and established habits of industry and regularity, is obtained from principals and headmasters, and may be supplemented through personal interviews. The University reserves the right to require any candidate for admission to present himself for an interview and to base the selection of candidates in part upon the appraisals obtained through such interviews.

IV. SCHOLASTIC APTITUDE TESTS AND OTHER TESTS

Examinations may be made available to students whose qualifications for admission are in doubt. Permission to take entrance examinations is granted only at the discretion of the office of admissions. This written permission must be received before an applicant lays any plans to enter Lehigh University by examination. Examinations will not be given as a substitute admission procedure when an applicant's record is in general unsatisfactory, but will be assigned only to obtain supplementary evidence where there is reasonable doubt as to the applicant's readiness to do successful college work.

Two forms of examinations are available, Plan A and Plan B.

Under Plan A the applicant will take an examination in each subject which he has failed to pass or has passed with a grade too low to merit admission without further validation of his preparation in the subject. Deficiencies in prescribed entrance units never taken in school may also be made up by Plan A examinations.

Under Plan B the applicant is examined for his general ability to do college work. This plan will include three examinations: English comprehensive, mathematics comprehensive, and a scholastic aptitude test.

SCHOLASTIC APTITUDE TEST

Any candidate may be required to take a scholastic aptitude test. Ordinarily this test will be required of students ranking in the lower half of their graduating class in the high school or preparatory school. In cases where such a test is required the

University may prescribe either the scholastic aptitude test given by the College Entrance Examination Board or a scholastic aptitude test to be taken at the University.

APPLICATIONS FOR ADMISSION

Applications for admission to the University should be submitted to the director of admissions, Lehigh University, Bethlehem, Pennsylvania, as early as possible during the applicant's senior year in secondary school. Since the University is unable to admit all qualified applicants, applications received later than July 1 of any year cannot be assured the same consideration that is given to applications received prior to July 1. Appropriate forms for filing application for admission may be secured from the director of admissions.

ACCEPTANCE OF ADMISSION AND DEPOSIT

Each candidate who is notified of admission is required to file with the office of admissions, within ten days after such notification, a formal acceptance of his admission, asserting his definite intention to enroll in Lehigh University on a specified date; and this formal acceptance must be accompanied by a deposit of \$25 (check or money order payable to Lehigh University).

This deposit will be applied toward the incidental and laboratory fees and deposits for the first semester; but the deposit is forfeited in case of non-enrollment for the specified semester.

ACCREDITED SCHOOLS

Lehigh University has no permanent arrangement with any school whereby certificates are accepted in place of entrance examinations; but certificates are ordinarily accepted from first-class high schools in Pennsylvania and from schools accredited by the Middle States Association of Colleges and Secondary Schools, the New England College Entrance Certificate Board, the Regents of the University of the State of New York, the North Central Association of Colleges and Secondary Schools, the Association of Colleges and Secondary Schools of the Southern States, and the state universities of those states having such institutions.

ADMISSION OF STUDENTS

ADMISSION BY EXAMINATION

Examinations at the University

Examinations for admission to the University will be held in 1941-1942 as follows:

	1941		1942	
Business Law	June 12	Sept. 4	Jan. 22	10:30 a.m.
College Aptitude	June 14	Sept. 6	Jan. 24	10:30 a.m.
English				
Three-unit examination	June 12	Sept. 4	Jan. 22	8:30 a.m.
Examination for fourth unit...	June 12	Sept. 4	Jan. 22	4:00 p.m.
Foreign Language				
French	June 12	Sept. 4	Jan. 22	2:00 p.m.
German	June 12	Sept. 4	Jan. 22	2:00 p.m.
Latin	June 11	Sept. 3	Jan. 21	4:00 p.m.
Spanish	June 12	Sept. 4	Jan. 22	2:00 p.m.
Mathematics				
Algebra—Elementary	June 13	Sept. 5	Jan. 23	2:00 p.m.
Intermediate	June 13	Sept. 5	Jan. 23	4:00 p.m.
Advanced	June 13	Sept. 5	Jan. 23	10:30 a.m.
Geometry—Plane	June 13	Sept. 5	Jan. 23	10:30 a.m.
Solid	June 13	Sept. 5	Jan. 23	8:30 a.m.
General Mathematics	June 13	Sept. 5	Jan. 23	8:30 a.m.
Trigonometry	June 13	Sept. 5	Jan. 23	2:00 p.m.
Science				
Biology	June 11	Sept. 3	Jan. 21	8:30 a.m.
Chemistry	June 11	Sept. 3	Jan. 21	8:30 a.m.
General Science	June 11	Sept. 3	Jan. 21	8:30 a.m.
Physics	June 11	Sept. 4	Jan. 22	4:00 p.m.
Physiology	June 11	Sept. 3	Jan. 21	8:30 a.m.
Zoology	June 11	Sept. 3	Jan. 21	8:30 a.m.
Social Studies				
Civics	June 11	Sept. 3	Jan. 21	10:30 a.m.
Economics	June 12	Sept. 4	Jan. 22	4:00 p.m.
History—American	June 11	Sept. 3	Jan. 21	2:00 p.m.
Ancient	June 11	Sept. 3	Jan. 21	4:00 p.m.
English	June 11	Sept. 3	Jan. 21	2:00 p.m.
Medieval	June 11	Sept. 3	Jan. 21	2:00 p.m.
Medieval and Modern...	June 11	Sept. 3	Jan. 21	10:30 a.m.
Modern	June 11	Sept. 3	Jan. 21	10:30 a.m.
World	June 11	Sept. 3	Jan. 21	4:00 p.m.
Problems of Democracy	June 11	Sept. 3	Jan. 21	10:30 a.m.

Examinations in other subjects presented for elective units may be arranged by correspondence with the director of admissions.

ADMISSION TO ADVANCED STANDING

Candidates for admission by transfer from other institutions may be admitted with advanced standing, subject to the enrollment limitations of the several divisions of the University, provided their college records up to the time of transfer are thoroughly satisfactory to the University. Such candidates must have met the entrance requirements prescribed for undergraduates.

A student who desires to transfer to Lehigh University from another university, college, or junior college, must submit an official transcript of his record in the other institution; this transcript should include his college credits, a list of the entrance credits accepted for admission to that other institution, and a statement of honorable dismissal.

A candidate who has attended more than one university, college, or junior college, must present a record from each institution; failure to submit a complete record of former academic experience will result in cancellation of registration.

Graduates of recognized colleges of liberal arts and sciences whose courses have included a year of physics, a year of chemistry, and mathematics through the calculus may ordinarily earn the degree of B.S. in engineering from Lehigh University on the successful completion of a two-year program which will be individually planned for each candidate.

A student who intends to enter an engineering curriculum at Lehigh University after graduation from college should so arrange his work in college as to cover as many as possible of the subjects of the freshman and sophomore years of the engineering curriculum he selects.

Examinations for Advanced Standing

Candidates who have completed advanced courses in approved secondary schools may, with the consent of the director of admissions and of the department concerned, receive permits to take anticipatory examinations without fee to establish advanced standing on the basis of work completed in secondary schools.

Candidates for admission who wish to take examinations for advanced credit in any subject should notify the director of admissions before September 1.

TUITION

ADMISSION OF SPECIAL STUDENTS

Special students may be admitted on recommendation of the director of admissions and of the director of the curriculum in which the candidate wishes to enroll, subject to the approval of the committee on admissions. Candidates must be at least twenty-one years of age and must present evidence of ability to pursue with profit the subjects that they wish to study at the University.

LATEST DATE FOR REGISTRATION

No registration of new students is accepted later than the tenth day of instruction in any semester.

VACCINATION REQUIREMENT

Smallpox vaccination is required, under the laws of the Commonwealth of Pennsylvania, for all students entering the University. Certificates are accepted for this requirement when the vaccination has been performed within three years of the time of matriculation, has resulted in a true vaccinia (take), and the scar gives evidence of a recent vaccinia. Since the vaccinations at the University are performed and the reactions read by the method recommended by the United States Public Health Service, students are advised to wait until they arrive at the University to have this done.

UNDERGRADUATE TUITION AND OTHER FEES

Tuition, in all colleges of the University, per annum.....	\$400.00
Health service fee	12.00
Athletic fee	15.00
Library fee	5.00
Student activities fee	5.00
Students concerts-lectures fee	1.00
Total annual fees	\$438.00

These fees are payable as follows:

FIRST SEMESTER

(Payable on the registration days in September)

Tuition fee	\$225.00
Athletic fee	10.00
One-half of the annual health service fee	6.00
One-half of the annual student activities fee	2.50
One-half of the annual library fee	2.50
Student concerts-lectures fee	1.00
Total fees, first semester	\$247.00

LEHIGH UNIVERSITY

SECOND SEMESTER*

(Payable on the registration days in February)

Tuition fee	\$175.00
Athletic fee	5.00
One-half of the annual health service fee	6.00
One-half of the annual student activities fee	2.50
One-half of the annual library fee	2.50
Total fees, second semester	<u>\$191.00</u>

* Students entering in the second semester pay first semester tuition (\$225.00), and student concerts-lectures fee of fifty cents.

MATRICULATION AND GRADUATION FEES. New students pay, once only, on admission, a matriculation fee of \$5.00; students at graduation pay a graduation fee of \$10.00.

LABORATORY FEES AND DEPOSITS. There are also laboratory fees or deposits in laboratory courses to cover the cost of laboratory supplies used by the individual students and to provide for breakage of glassware and instruments. For convenient reference a schedule of the laboratory fees for various courses is given below. A deposit of \$25.00 is made by each student taking courses in military science and tactics; this deposit is refunded when the government property issued to the student is returned.

LATE REGISTRATION FEES. The penalty for late registration is \$1.00 a day up to a maximum of \$5.00, for each day of delay beyond the registration days in taking out the registration ticket; and a registration not completed within three days after the date on the registration ticket is subject to a late registration fee of \$1.00 a day up to a maximum of \$5.00.

LABORATORY FEES AND DEPOSITS PER SEMESTER

(Unless otherwise noted, the amounts listed indicate fees which are payable and not returnable.)

Biology

Biology	\$ 3.00
Mammalian Anatomy	5.00
Comparative Anatomy of Vertebrates	3.00
Botany	3.00
Zoology	3.00
Animal Ecology	3.00
Economic Botany	3.00
Sanitary Bacteriology	3.00
Bacteriology	3.00
Biology of Bacteria	3.00
Natural History and Ecology	2.00
Histology	3.00
Advanced Bacteriology	3.00
Industrial Bacteriology	3.00
Public Sanitation	3.00

TUITION

Chemistry

Note: The following amounts are all deposits and unused balances are returnable.

Chemistry Laboratory	\$15.00
Elementary Chemistry and Qualitative Analysis	25.00
Semi-micro-qualitative Analysis	15.00
Quantitative Analysis	25.00 or 30.00
Assaying, Coal, Gas, and Oil Analysis	30.00
Chemical Engineering	15.00 or 25.00
Research Chemistry Laboratory	15.00
Advanced Analytical Chemistry	30.00
Radiation Methods Laboratory	10.00
Qualitative Organic Chemistry	10.00
Organic Chemistry Laboratory	30.00 or 40.00
Advanced Organic Laboratory	30.00
Industrial Biochemistry Laboratory	15.00
Chemical Engineering Practice	10.00
Physical Chemistry Laboratory	10.00
Electrochemistry Laboratory	5.00

Civil Engineering

Materials Testing Laboratory	\$ 5.00
Hydraulics Laboratory	5.00
Mechanics of Materials	2.50
Hydraulics	5.00
Concrete Laboratory	5.00

Electrical Engineering

Dynamo Laboratory, Elementary	\$ 6.00
Dynamo Laboratory, Intermediate	6.00
Dynamo Laboratory, Advanced	6.00 or 12.00
Dynamo Laboratory, Beginning	6.00
Dynamo Laboratory, Combined	6.00
Electrical Communication	6.00
Electric Transients	6.00

English

Contemporary Literature, book fee	\$2.50
Dramatics	3.00
Dramatics (summer session)	5.00
<i>Brown and White</i>	1.00
Newspaper Reporting and Writing	2.00
Advanced Newspaper Reporting and Writing	2.00
Newspaper Editing and Copy Reading	1.50
Feature and Magazine Writing	1.50

Geology

Mineralogy	\$ 5.00
Engineering Mineralogy	5.00
Principles of Geology	1.00
Field Geology	1.00
Petrography	3.00

Mechanical and Industrial Engineering

Engineering Laboratory	\$ 6.00
Flight Theory	40.00
Advanced Work in Engineering Laboratory	6.00

Metallurgical Engineering

Deposit:	
Thesis in Metallurgy	\$10.00
Fees:	
Metallurgical Laboratory	\$ 5.00
Introduction to Metallurgy	5.00
Metallurgy of Iron and Steel	5.00
Physical Metallurgy	5.00
Metallography	5.00
Electrochemical Laboratory	5.00

Mining Engineering

Deposits:	
Fuel Technology Laboratory	\$10.00
Flotation	10.00
Fee:	
Ore Dressing, Coal Preparation and Laboratory	\$ 5.00

Physics

Introduction to Physics	\$ 6.00
General Physics Laboratory	10.00
Mechanics, Properties of Matter and Light	6.00
Dynamics and Heat	6.00
Electricity and Magnetism	6.00
Electrical Laboratory	6.00
Electric Oscillations and Electric Waves	6.00
Physical Optics and Spectroscopy	6.00
Electrical Discharge through Gases	6.00
Pyrometry	6.00
Geophysics	6.00
Advanced Laboratory	6.00

SUMMER SESSION TUITION. The tuition for courses taken in the summer session is at the rate of \$10.00 a credit hour.

EXAMINATION FEES. Students who for satisfactory reasons were absent from final examinations will, upon petition, be allowed to take make-up examinations without payment of any examination fee. A fee of \$5.00 is charged for any examination subsequent to the first regular final or make-up examination allowed upon petition, and for a re-examination in any course. This regulation applies to the psychological and placement examinations required of new students if taken at other than the scheduled date.

LATE PHYSICAL EXAMINATION FEE. Any student who fails to keep his appointment for his physical examination is charged a late examination fee at the rate of \$1.00 a day up to a maximum of \$5.00 until he applies for and meets another appointment; if he fails to meet the second appointment or any subsequent appointment, he again becomes subject to a similar fee.

REFUNDS. In the event that a student withdraws from the University after the payment of fees, he may elect either to receive a refund according to the schedule indicated below, or to receive credit in full in proportion to the remaining fraction of the semester if and when he returns to the University.

To a student who formally withdraws within the first week (*i. e.*, the first six days of instruction) of the semester, a refund in full will be made of tuition fee, athletic fee, student activities fee, and unused balance of laboratory fees.

To a student who formally withdraws after the first week, half of these fees will be retained, and a fraction of the other half will be refunded proportional to the remainder of the semester.

TUITION

To a student who formally withdraws at any time and does not receive a refund, full credit for these fees in proportion to the fraction of the semester remaining after the withdrawal will be allowed if and when that student re-enrolls in the University.

In the event of death of a student, the above fees will be refunded in full in proportion to the fraction of the semester remaining at the time of his death.

No refund nor credit is allowed on the health service fee, nor on the library fee. The matriculation fee is never refunded.

EXEMPTIONS. Students registered for fewer than seven semester hours are exempted from the library and health service fees. The payment of the athletic fee and the student activities fee is optional for graduate students and also for undergraduates who are registered for fewer than seven semester hours.

SPECIAL SCHEDULES. Tuition for special schedules of less than twelve hours in any semester is at the rate of \$12.50 a semester hour.

STUDENT ACTIVITIES FEE. The student activities fee is appropriated as follows: *Lehigh Brown and White*, \$1.75; *Arcadia*, \$1.15; Class dues, \$0.70; Mustard and Cheese Club, \$0.50; Combined Musical Clubs, \$0.30; Band, \$0.40; debating, \$0.20. For this fee each student receives a year's subscription to the semi-weekly undergraduate newspaper, tickets to each dramatic performance given by the Mustard and Cheese Club, and tickets to the concerts of the Combined Musical Clubs. In addition, this fee covers all class and student government (*Arcadia*) dues. The appropriation for the band and for debating represents student support of those activities.

EXPENSES

Minimum expenses for the collegiate year, clothing and travel not included, are estimated at \$600.00 in addition to tuition.

Expenses of undergraduates vary somewhat according to the habits and tastes of the individual students. There are certain basic expenses, however, which must be met by all students; these expenses are listed below. A chart of necessary expenses for the freshman year might be constructed as follows:

LEHIGH UNIVERSITY

First Semester:		Minimum	Average
Matriculation fee	.....	\$ 5.00	\$ 5.00
Health service fee (one-half)	.....	6.00	6.00
Athletic fee (two-thirds)	.....	10.00	10.00
Activities fee (one-half)	.....	2.50	2.50
Library fee (one-half)	.....	2.50	2.50
Student concerts-lectures fee	.....	1.00	1.00
Tuition	.....	225.00	225.00
*Military uniform deposit	.....	25.00	25.00
†Physics laboratory fee	.....	6.00	6.00
‡Chemistry deposit	.....	15.00	15.00
Books	.....	30.00	35.00
Supplies	.....	15.00	20.00
Dormitory room (one-half)	.....	50.00	75.00
Board	.....	120.00	150.00
		\$513.00	\$578.00
Second Semester:			
Health service fee (one-half)	.....	\$ 6.00	\$ 6.00
Athletic fee (one-third)	.....	5.00	5.00
Activities fee (one-half)	.....	2.50	2.50
Library fee (one-half)	.....	2.50	2.50
Tuition	.....	175.00	175.00
‡Chemistry deposit	.....	25.00	25.00
Books and supplies	.....	10.00	15.00
Dormitory room (one-half)	.....	50.00	75.00
Board	.....	120.00	150.00
		\$396.00	\$456.00
Total, freshman year	.....	\$909.00	\$1034.00

* Returned at the end of the year.

† This may become due the second semester instead of the first.

‡ Unused portion is returned at the end of the semester.

The above does not include drawing instruments nor slide rule. These vary in price, but adequate drawing sets may be had at \$1.00, and slide rules at \$1.00 and higher, \$10.00 representing a fair allowance for a rule which will serve throughout the college course and in professional work.

Books, stationery, and drawing instruments may be purchased at the supply bureau in the Alumni Memorial Building.

Items of personal expense, clothes, travel, and the like cannot be estimated except for each student individually, according to his personal habits and circumstances. If a prospective student plans to accept an invitation to join a fraternity, he should anticipate an additional annual cost of approximately \$90.00 plus the amount of initiation fee. The initiation fee varies considerably among the fraternities, but can always be ascertained before joining.

DORMITORIES

There are dormitory accommodations in the Henry Reese Price House, the Charles Lewis Taylor House, the Charles Russ Richards House, and the Henry Sturgis Drinker House for 453 students.

Rental is from \$50 to \$200 a year for each occupant. Only a limited number of the lower rental rooms is available. The policy of the University is to make these accommodations available to students in all classes. Returning students are given the first opportunity to select dormitory rooms, this selection being made in March of each year. Immediately following this selection, the remaining rooms are available to new students. Full information regarding dormitory accommodations will be sent upon request addressed to the director of admissions.

A campus restaurant is located in Drown Memorial Hall. Numerous private householders in the city offer rooms and board at moderate prices; information concerning such rooms and board may be obtained from the director of admissions.

FRESHMAN WEEK

Each fall the members of the incoming class are instructed to report at the University five days in advance of the registration days, for participation in a program of exercises known as freshman week.

This program has two purposes, orientation and placement.

ORIENTATION. There are great differences between the secondary school (whether public high school or private preparatory school) and the college—differences in environment and living conditions, and differences also in methods of instruction and discipline; and some freshmen do badly during their first year largely because they do not succeed in adapting themselves quickly enough and thoroughly enough to these new conditions and methods. It has been found that many of these difficulties can be forestalled by giving the freshmen, at the very beginning, before the regular work of the college year has begun, definite instruction and guidance with respect to the new problems they will encounter—that in this way they can be *oriented*, or taught their way about in their new environment, in advance. Three-fourths of the exercises of freshman week are devoted to this purpose.

PLACEMENT. The freshmen come from many different schools, and there are, inevitably, considerable differences among these

schools in thoroughness of instruction in the various subjects. Formerly the colleges ignored these differences and put all the freshmen together in classes which were assigned the same work to do—work which was well adapted to the majority but which was nevertheless too hard for some and too easy for others. Now, however, in many institutions, the freshmen are given preliminary tests in the more fundamental subjects, and in accordance with their showing in these tests are *placed* in different groups, where the instruction is adapted to their various needs. A few of these periods during freshman week are devoted to these placement tests. It should be understood that these tests are *not* entrance examinations; no freshman will be rejected on the results; their sole object is to determine for each man in which particular courses or sections he can do the best work and make the most progress.

It is the experience of a number of colleges and universities, including Lehigh, that such a program is highly valuable to freshman students, in assisting them to adjust themselves to their new work.

**The College of
Arts and Science**

THE COLLEGE OF ARTS AND SCIENCE

Administrative officers

Clement Clarence Williams, *President of the University*

Philip Mason Palmer, *Dean of the College of Arts
and Science*

Wray Hollowell Congdon, *Dean of Undergraduates*

George Bartlett Curtis, *Registrar*

Earl Kenneth Smiley, *Director of Admissions*

Faculty

Allen Jennings Barthold.....	<i>Romance Languages</i>
Frank Swan Beale.....	<i>Mathematics</i>
Claude Gillette Beardslee.....	<i>Moral and Religious Philosophy</i>
Frank Chester Becker.....	<i>Philosophy</i>
Sidney MacGillvary Brown.....	<i>History</i>
Leonard Pattillo Burton.....	<i>Mathematics</i>
Robert Dexter Butler.....	<i>Geology</i>
Joseph Calvin Callaghan.....	<i>English and Speech</i>
Glenn James Christensen.....	<i>English</i>
James Lowry Clifford.....	<i>English</i>
Wray Hollowell Congdon.....	<i>Education</i>
Earl LeVerne Crum.....	<i>Greek</i>
Edward Hutchins Cutler.....	<i>Mathematics</i>
George Dormer Farné.....	<i>Romance Languages</i>
Adelbert Ford.....	<i>Psychology</i>
Tomlinson Fort.....	<i>Mathematics</i>
Donald McCoy Fraser.....	<i>Geology</i>
Augustus Henry Fretz.....	<i>Geology</i>
Eugene R. L. Gaughran.....	<i>Biology</i>
Lawrence Henry Gipson.....	<i>History</i>
Wilson Leon Godshall.....	<i>History</i>
James Larmour Graham.....	<i>Psychology</i>
Dale Hartzler Gramley.....	<i>Journalism</i>
Robert William Hall.....	<i>Biology</i>

George Dewey Harmon	<i>History</i>
Nicholas Hunter Heck	<i>Geophysics</i>
Kenneth Baker Horning	<i>English</i>
Garth Ahyman Howland	<i>Fine Arts</i>
Percy Hughes	<i>Philosophy</i>
William Leroy Jenkins	<i>Psychology</i>
Everett Lee Jones	<i>English</i>
Kenneth Karl Kost	<i>Journalism</i>
Theodore Thomas Lafferty	<i>Philosophy and Education</i>
Kenneth Worcester Lamson	<i>Mathematics</i>
Robert Edward Laramy	<i>Education</i>
Voris V. Latshaw	<i>Mathematics</i>
William Andrew McDonald	<i>Latin</i>
Robert Francis McNerney	<i>Romance Languages</i>
Benjamin LeRoy Miller	<i>Geology</i>
Charles John Moravec	<i>Journalism</i>
Robert Pattison More	<i>German</i>
Philip Mason Palmer	<i>German</i>
Basil Waldo Parker	<i>Biology</i>
Eugene Park	<i>Mathematics</i>
Donald Theodore Perkins	<i>Mathematics</i>
Arthur Everett Pitcher	<i>Mathematics</i>
George Emil Raynor	<i>Mathematics</i>
Joseph Benson Reynolds	<i>Mathematics</i>
Albert Augustus Rights	<i>English and Speech</i>
Edgar Heisler Riley	<i>English</i>
John Griffith Roberts	<i>Romance Languages</i>
Ernst Bernhard Schulz	<i>Government</i>
David Gallup Scott	<i>Romance Languages</i>
James Plattenberger Sell	<i>Biology</i>
Jonathan Burke Severs	<i>English</i>
Thomas Edgar Shields	<i>Music</i>
Clarence Albert Shook	<i>Mathematics</i>
Eugene Hulse Sloane	<i>English</i>
Lloyd LeRoy Smail	<i>Mathematics</i>
Malcolm Finley Smiley	<i>Mathematics</i>
Elmer Gould Smith	<i>Biology</i>
Robert Metcalf Smith	<i>English</i>
Rafael Arcángel Soto	<i>Romance Languages</i>
Carl Ferdinand Strauch	<i>English</i>

Harry Alfred Strauss, Jr.....	<i>Education</i>
Harold Prescott Thomas.....	<i>Education</i>
Stanley Judson Thomas.....	<i>Biology</i>
William Burton Todd.....	<i>English</i>
William Reagle Transue.....	<i>Mathematics</i>
Francis John Trembley.....	<i>Biology</i>
John Schrader Tremper.....	<i>German</i>
Ralph Newcomb Van Arnam.....	<i>Mathematics and Astronomy</i>
John Livesey Vanderslice.....	<i>Mathematics</i>
Louis Addison Waters.....	<i>English</i>
Lawrence Whitcomb.....	<i>Geology</i>
Raymond Harry White.....	<i>Education</i>
Bradford Willard.....	<i>Geology</i>
Horace Wetherill Wright.....	<i>Latin</i>

THE COLLEGE OF ARTS AND SCIENCE

The College of Arts and Science of Lehigh University comprises the departments of biology, education, English, fine arts, geology, German, Greek, history and government, Latin, mathematics and astronomy, music, moral and religious philosophy, philosophy, psychology, and romance languages. Courses in economics, sociology, accounting, and finance are provided by the College of Business Administration; physics and chemistry are supplied by the College of Engineering.

The degree of Bachelor of Arts is conferred upon graduates of the College of Arts and Science.

Requirements for Graduation

1. The completion of one hundred twenty credit hours of collegiate work, apportioned so as to cover the distribution and concentration requirements, in addition to military science and tactics, moral and religious philosophy, and physical education, required of all students.
2. The passing of a comprehensive examination in the major field.

The Course of Study

Each student in the College of Arts and Science is considered from the beginning of his course as an individual. The College

expects every student to have a well-defined purpose at entrance, but recognizes the student's right to change his objective and for that reason gives him two years in which to find himself and establish the direction of his future career. To help the student in his decision, the College provides an advisory staff consisting of the dean of the College, who is adviser of freshmen, and the heads of departments in which major sequences are given. The individual program for each student is outlined tentatively in an interview with the dean of the College during freshman week. This preliminary program is determined by the nature and quality of the student's preparation and by the student's personal interests. The final program, which is made out in detail at the end of the sophomore year, takes into account, in addition, demonstrated aptitudes and pre-professional or vocational needs.

These individual programs admit of considerable elective choice. The number of elective courses depends upon the demands of the distribution and concentration requirements which occupy from sixty to eighty per cent of the student's time. The number of purely elective hours ranges from twenty-one to forty-five out of the hundred and twenty required for graduation. In general, the student in the College of Arts and Science may elect any undergraduate course given at the University for which he has the prerequisites. This privilege combined with the wide choice offered by the major sequences, *i. e.*, the concentration requirements, enables the College to provide specialization in a large number of fields and preparation for individual careers.

Preparation for Professional Schools and the Professions

The College of Arts and Science provides the preliminary training necessary for admission to the various graduate schools and, in some cases, notably in teaching and journalism, prepares directly for a profession. Since a large proportion of the graduates of the College of Arts and Science of Lehigh University continue their work in graduate schools, the College offers a number of course combinations designed to give preliminary training for the various fields of medicine, dentistry, public health, law, theology, engineering, business administration, etc. Students who are looking forward toward any one of the graduate schools should consult the dean of the College, who will assist them to plan their courses. Illustrative combinations are listed below.

Preparation for Schools of Medicine, Dentistry, and Public Health

The leading medical schools require a college degree for entrance. They also demand preparation in certain subjects, specifically: from twelve to twenty-four semester hours of chemistry, at least eight semester hours of physics, and from eight to twelve hours of biology; a reading knowledge of one or more languages, usually German or French or both. The sequence of science courses outlined below is based on these requirements and includes a major in biology. In general, the College believes that the prospective physician should have a broad background and not be over specialized.

FIRST SEMESTER		FRESHMAN YEAR		SECOND SEMESTER	
Title	Cr. Hrs.	Title	Cr. Hrs.		
Elementary Chemistry	2	Stoichiometry	1		
or Intermediate Chemistry		Qualitative Analysis	3		
Chemistry Laboratory	2	Mammalian Anatomy	2		
Zoology	3				

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
Introduction to Physics	3	General Physics	5		
Quantitative Analysis	3	Genetics	1		
Quantitative Analysis Conf.	1				

FIRST SEMESTER		JUNIOR YEAR		SECOND SEMESTER	
Inorganic Chemistry	3	Advanced Bacteriology	3		
Bacteriology	3	Comparative Anatomy	3		

FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
Embryology	3	Physiology	3		
Immunology	3	Histology	3		
Organic Chemistry	3	Organic Chemistry	3		
Organic Chemistry Laboratory ..	2				

The major in public health is similar to the program arranged for pre-medical students with the exception that less anatomy is taken and in its place advanced courses in public sanitation and serology are elected.

Students looking forward to dentistry are advised to complete the four-year college course. The work prescribed is the same as for medicine. For students who are unable to spend four years in preparation, special programs covering two or three years will be arranged.

The professor of biology is the official adviser of students preparing for medicine.

Preparation for Law Schools

In general the law schools do not specify any particular preparation beyond that required for a B.A. or B.S. degree. The prospective law student should major in the field which most interests him but should at all events elect courses in English, history, government, economics, and psychology. Latin is not essential but is strongly recommended. At least one course in accounting should be elected by students who are planning to enter corporation law as a profession.

Preparation for Teaching

Students who expect to teach upon graduation should consult with the department of education early in their college course. A license or certificate is required of everyone who teaches in the public schools of Pennsylvania or of any other state. The approved certificate in Pennsylvania for college graduates is the college provisional certificate granted upon completion of twenty-one semester hours of professional or pedagogical courses (including elementary psychology) and a minimum of eighteen semester hours in each subject which the candidate expects to teach. The twenty-one semester hours of professional studies are apportioned as follows:

FRESHMAN YEAR		SECOND SEMESTER	
FIRST SEMESTER			
Title	Cr. Hrs.	Title	Cr. Hrs.
		Psychology	3
SOPHOMORE YEAR		SECOND SEMESTER	
FIRST SEMESTER			
Introduction to Teaching	3	Educational Psychology	3
JUNIOR YEAR		SECOND SEMESTER	
FIRST SEMESTER			
High School Teaching	3	Education in Europe	} 3
		or Secondary Education ..	
		or Visual Instruction	
SENIOR YEAR		SECOND SEMESTER	
FIRST SEMESTER			
Observation of Teaching	3	Practice Teaching	3

This program may be modified to meet individual needs or the specific requirements of states other than Pennsylvania.

A student who is preparing to teach should major in the subject he prefers to teach, or in education. Practice teaching is done mainly in the Bethlehem High School; but observation, practice, and substitute teaching may be done in elementary schools in Bethlehem and elsewhere. The department of physical education offers courses for students who anticipate coaching and supervision of physical education.

Preparation for Journalism

Students who plan to enter the field of journalism directly or through the medium of the Graduate School should choose for their field of concentration the major in journalism offered by the College of Arts and Science.

The program of courses required and the sequence advised is as follows:

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>
Reporting	3	Advanced Reporting	3		
Drama	3	Drama	3		
Economics	3	Economics	3		
Brown and White	1	Brown and White	1		

FIRST SEMESTER		JUNIOR YEAR		SECOND SEMESTER	
Feature Writing	3		Newspaper Problems	3	
or Editorial Writing			or History of American Journalism		
Copyreading	3		Public Finance	3	
Marketing	3		Advertising	3	
National Government	3		State Government	3	
American Foreign Policy	3		American Foreign Policy	3	
Brown and White	1		Brown and White	1	

FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
Editorial Writing	3		History of American Journ. }	3	
or Feature Writing			or Newspaper Problems.... }		
Labor Problems	3		Journalism Proseminar	3	
Sociology	3		Sociology	3	
English Elective	3		English Elective	3	
Municipal Management	3		Municipal Management	3	
or Elective			or Elective		
Brown and White	1		Brown and White	1	

Preparation for Public Service

There is at present in the United States a limited number of opportunities for administrative careers in the public service for men who have acquired a liberal arts degree and have done graduate work in the social sciences.

The essentials of undergraduate preparation for the several categories of public service, whether professional, scientific, administrative, or non-professional, are substantially the same as for the corresponding classifications in the field of private enterprise. The undergraduate should acquire a knowledge of political, economic, and social institutions, procedures, and processes. He should also acquire proficiency in the use of certain techniques, such as oral and written English, accounting, statistics, and library methods.

Students who are preparing for public service must meet the distribution and major requirements of the College. Two illustrative sequences based upon a major in government are listed below. Other combinations may be arranged to meet specific needs.

Preparation for the Foreign Service

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>
European History	3	European History	3	European History	3
United States History	3	United States History	3	United States History	3
Accounting	3	Accounting	3	Accounting	3
		Economic Geography	3	Economic Geography	3
FIRST SEMESTER		JUNIOR YEAR		SECOND SEMESTER	
American Government	3	American Government	3	American Government	3
Diplomacy in the 19th and 20th Centuries	3	International Politics	3	International Politics	3
American Foreign Policy	3	American Foreign Policy	3	American Foreign Policy	3
Statistical Method	3	Business Law	3	Business Law	3
FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
International Law	3	International Law	3	International Law	3
Hispanic America in the 19th Century	3	Hispanic America in the 20th Century	3	Hispanic America in the 20th Century	3
Foreign Exchange	3	Banking and Credit Policies ..	3	Banking and Credit Policies ..	3

The examinations for entrance into the foreign service also include one modern language (French, Spanish, or German); the history of the Far East; and commercial and maritime law.

Preparation for the Profession of City Manager

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>
American Government	3	American Government	3	American Government	3
United States History	3	United States History	3	United States History	3
Accounting	3	Accounting	3	Accounting	3
FIRST SEMESTER		JUNIOR YEAR		SECOND SEMESTER	
Municipal Government	3	Municipal Administration	3	Municipal Administration	3
Sociology	3	Sociology	3	Sociology	3
Social Psychology	3	Public Finance	3	Public Finance	3
FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
Contemporary Political Thought	3	Contemporary Political Thought	3	Contemporary Political Thought	3
Statistical Method	3	Public Utilities	3	Public Utilities	3
Psych. of Industrial Personnel	3	Personnel Administration	3	Personnel Administration	3
Cost Accounting	3	Sanitary Bacteriology	3	Sanitary Bacteriology	3

Preparation for Engineering

If a student in the College of Arts and Science contemplates becoming a candidate for a degree in engineering after the completion of his B.A. curriculum, he should major in mathematics,

business, physics, or chemistry, and choose as electives such technical studies as are contained in the earlier years of the engineering curriculum which he wishes to complete. By carefully selecting electives, with the advice and guidance of the dean of the College and the professor in charge of the engineering curriculum concerned, the graduate of the B.A. curriculum may enter the engineering curriculum chosen in full standing, and obtain his engineering degree in one or two years of further study. A detailed plan is made for each student.

Preparation for Business Administration

Students who are looking forward to further work in an undergraduate or graduate school of business administration, or students who plan to enter business directly upon completion of their curriculum in arts and science should major in the field of their special interests but should elect at least three one-year courses in economics or business administration beyond the introductory economics.

Preparation for Actuarial Science

Students who are interested in preparation for actuarial work with insurance companies or elsewhere should plan to major in mathematics and follow the plan outlined below:

FIRST SEMESTER		FRESHMAN YEAR		SECOND SEMESTER	
<i>Title</i>		<i>Cr. Hrs.</i>	<i>Title</i>	<i>Cr. Hrs.</i>	
Algebra and Analytic Geometry		3	Analytic Geometry and Calculus		3

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
Calculus		3	Intermediate Calculus		3
Mathematics of Finance		3	Mathematics of Statistics		3
Economics		3	Economics		3

FIRST SEMESTER		JUNIOR YEAR		SECOND SEMESTER	
Advanced Algebra		3	Mathematics of Life Insurance		3
Accounting		3	Accounting		3

FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
Finite Differences		3	Theory of Errors		3
Advanced Economics		3	Advanced Economics		3

Preparation for Other Fields

The various major sequences outlined on pages 53 to 65 provide intensive work in the subjects represented and prepare directly for graduate study.

The Curriculum

The curriculum is based upon the principles of distribution and concentration. The object of the distribution requirements is to give the student an elementary knowledge of the fields of contemporary thought and to orient him in the world of man and nature. These requirements are coordinated with the work of the preparatory schools, the number and nature of the prescribed courses to be taken in college being dependent upon the subjects presented for entrance.

The Distribution of Requirements

The distribution requirements are divided into three groups.

GROUP I. HUMANITIES

1. **ENGLISH.** Twelve semester hours. These are normally Engl. 1 and 2, Composition and Literature, and Engl. 4 and 5, Study of the Drama. Students who demonstrate satisfactory ability in written composition in their placement examinations may satisfy this English requirement by passing Engl. 3a and 3b, Types of World Literature, or an equivalent.

2. **FOREIGN LANGUAGE.** A reading knowledge of Latin, Greek, French, Spanish, or German and an elementary knowledge of a second of these languages are required of all students. The requirement takes into consideration work done in the preparatory schools and may be met in the following ways:

Reading knowledge. Students may satisfy this requirement by examination; otherwise, students who offer three or four years of Latin, French, Spanish, Greek, or German at entrance satisfy this requirement by passing Lat. 1, 2, Pliny and Horace, Gk. 7, Thucydides, and Gk. 8, Tragedy, Fr. 13, 14, Types of French Literature, or Fr. 21, 22, Seventeenth and Eighteenth Century French Literature, Sp. 21, 22, Spanish Novels and Plays, or Ger. 10, Goethe's Faust, in course; those who offer only two years of Latin, Greek, French, Spanish, or German continue for two years the language presented. With the permission of the dean of the College, such students may substitute one of the other four languages. Students who offer two years of two or more languages, Latin, Greek, French, Spanish, or German, may choose from these the language they are to continue.

Elementary knowledge. The elementary knowledge may be established by examination at entrance or later, or by passing Lat. 31, Beginning Latin, and Lat. 32, Caesar, Gk. 1, 2, Elementary Greek, Fr. 1, 2, Elementary French, Sp. 1, 2, Elementary Spanish, Ital. 1, 2, Elementary Italian, or Ger. 1, 2, Elementary German, or any higher course in these languages.

3. ANCIENT CIVILIZATION OR FINE ARTS. Six semester hours. This requirement may be reduced to three hours if the student presents at entrance a year course in ancient history.

4. PHILOSOPHY OR MATHEMATICS. Six semester hours. If the student presents at entrance courses in solid geometry and plane trigonometry or equivalent the requirements may be reduced to three hours.

GROUP II. NATURAL SCIENCE

1. PHYSICAL SCIENCE. Nine semester hours to be chosen from three of the fields: chemistry, physics, geology, or astronomy. This requirement may be reduced to three hours if the student presents at entrance two of these sciences, or to six hours if he presents one.

2. BIOLOGICAL SCIENCE. Six semester hours to be selected from general biology, bacteriology, botany, paleontology, or zoology. This requirement may be reduced to three hours on the basis of entrance credit.

3. PSYCHOLOGY. Three semester hours.

GROUP III. SOCIAL SCIENCE

1. ECONOMICS. Six semester hours. The requirement may be met by entrance credit for one year of economics.

2. GOVERNMENT. Three semester hours.

3. EDUCATION, HISTORY, OR SOCIOLOGY. Nine semester hours. This requirement may be reduced to three hours on the basis of entrance credit.

Distribution requirements should be met as far as possible during the freshman and sophomore years. Electives during these years should be used as orientation courses for the purpose of enabling the student to discover his major interests.

Concentration Requirements

During the second semester of the freshman year each student must select some sequence of studies as his major field. A major consists of at least twelve semester hours of advanced work in the field chosen. Including preliminary college work, the minimum number of hours constituting a major is twenty-four. Change of major is permitted up to the end of the sophomore year. Majors must be approved by the professors concerned and the dean of the College.

The major work is designed to enable a student to master his chosen field so far as that is possible in the two years devoted to the subject. In all fields certain courses are prescribed but the mere passing of courses will not satisfy the major requirements. It is expected that the student will read widely in his subject and prepare himself largely through his own reading and his own independent work for his final comprehensive examination. After a student has selected a major subject, the head of the department in which the major is selected becomes the official adviser of the student and guides him in his choice of courses.

Comprehensive Examination

A comprehensive examination in the major subject is required of all students. This examination is given at the end of the senior year and may be oral or written or both. The comprehensive examination is given under the direction of the head of the major department; at least two university teachers, and, whenever possible, representatives of at least two departments take part in the examination.

Unscheduled Work

On the advice of the head of the department in which the major work is being done and with the consent of the dean of the College, a senior of unusual merit who wishes to concentrate in his chosen field may be allowed to substitute not more than six hours of unscheduled work per semester for six hours of elective work otherwise required for graduation.

Special Honors

Special honors are awarded at the end of the senior year, on recommendation of the head of the department concerned and by vote of the faculty, to students who have done advanced work of unusual merit in some chosen field. Candidates for special honors must indicate during their junior year their intention to work for such honors. Awards are based on grades obtained in the subject chosen, the results in extra work assigned, and the general proficiency of the candidate as evidenced by either a final examination or a thesis, as the head of the department involved may direct. No student who fails to pass his comprehensive examination with distinction is graduated with special honors.

Details of Concentration Requirements

MAJOR SEQUENCES

1. **BIOLOGY.** Three majors are offered by the department of biology: zoology, botany, and bacteriology.

a. **Zoology.** This major is designed for men who intend to enter medical school or to continue advanced instruction in a graduate school. The required courses in zoology are:

Biol. 10.	Zoology	(3)
Biol. 2.	Mammalian Anatomy	(2) or
Biol. 3.	Comparative Anatomy	(3)
Biol. 6.	Botany	(3)
Biol. 18.	Genetics	(2)
Biol. 54.	Bacteriology	(3)
Biol. 104.	Embryology	(3)
Biol. 153.	Advanced Bacteriology	(3)
Biol. 20.	Physiology	(3)
Biol. 113.	Histology	(3)
Biol. 158.	Immunology	(3)

b. **Botany.** This major is for men who intend to enter the teaching profession, or to do research in agriculture or in the economic phases of the science. The required courses are:

Biol. 10.	Zoology	(3)
Biol. 6.	Botany	(3)
Biol. 18.	Genetics	(2)
Biol. 54.	Bacteriology	(3)
Biol. 36.	Economic Botany	(3)

c. **Bacteriology.** This major is for men who intend to go into public health work or bacteriology either upon graduation or in pursuance of graduate study. The required courses are:

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Biol. 10.	Zoology	(3)
Biol. 6.	Botany	(3)
Biol. 18.	Genetics	(2)
Biol. 54.	Bacteriology	(3)
Biol. 153.	Adv. Bacteriology	(3)
Biol. 113.	Histology	(3)
Biol. 158.	Immunology	(3)

Optional

Biol. 155.	Industrial Bacteriology	(3)
Biol. 161.	Public Sanitation	(3)

All students taking a biology major will elect the following courses as collateral subjects: Chem. 1, 8, 9, 11, 20, 30, 41, 150, 151, and 165; Physics 12, 16, and 17. A reading knowledge of both French and German should be attained before graduation.

2. CHEMISTRY

Chem. 1 or 3.	Elementary Chemistry or Inter. Chem...	(2)
Chem. 11 or 13.	Chemistry Laboratory	(2)
Chem. 8.	Stoichiometry	(1)
Chem. 20.	Qualitative Analysis	(3)
Chem. 6.	Inorganic Chemistry	(3)
Chem. 7.	Physical Chemistry	(3)
Chem. 30, 31.	Quantitative Analysis	(6)
Chem. 41, 45.	Quantitative Analysis Conference	(2)
Chem. 150, 151.	Organic Chemistry	(6)
Chem. 165, 167.	Organic Chemistry Laboratory	(4)
Chem. 190.	Physical Chemistry	(3)
Chem. 193.	Physical Chemistry Laboratory	(2)

Required Collateral Courses

Phys. 12.	Introduction to Physics	(3)
Phys. 16.	General Physics	(3)
Phys. 17.	General Physics Laboratory	(2)
Math. 11.	Algebra and Analytic Geometry	(3)
Math. 12.	Analytic Geometry and Calculus	(3)
Math. 13.	Calculus	(3)

Suggested Electives

Chem. 158, 159.	Advanced Organic Chemistry	(6)
Chem. 194.	Physical Chemistry and Electrochemistry.	(3)
Chem. 197.	Electrochemistry Laboratory	(1)
Gk. 99.	Ancient Science	(3)

3. BUSINESS ADMINISTRATION AND ECONOMICS

A. Major in Social Institutions

SOPHOMORE YEAR

Eco. 3, 4.	Economics	(6)
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JUNIOR YEAR

Soc. 51.	Social Institutions	(3)
Fin. 126.	Public Finance	(3)
Eco. 107, 108.	Advanced Economics	(6)
E.S. 145.	Statistical Method	(3)
E.S. 146.	Business Cycles and Forecasting	(3)

ARTS AND SCIENCE

SENIOR YEAR

Eco.	133, 134.	Labor Problems	(6)
Soc.	161, 162.	Sociology and Social Problems	(6)
Soc.	171, 172.	Readings in Sociology	(6)

Suggested Electives

Fin.	135.	Transportation	(3)
Fin.	136.	Public Utilities	(3)
Govt.	157.	Municipal Government	(3)
Govt.	158.	Municipal Administration	(3)
Psych.	104.	Social Psychology	(3)
Govt.	62.	International Politics	(3)
Journ.	18.	History of American Journalism	(3)

B. Major in Economics

SOPHOMORE YEAR

Eco.	3, 4.	Economics	(6)
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JUNIOR YEAR

Eco.	107, 108.	Advanced Economics	(6)
Fin.	29, 30.	Money and Banking	(6)
E.S.	145.	Statistical Method	(3)
E.S.	146.	Business Cycles and Forecasting	(3)

SENIOR YEAR

Fin.	135.	Transportation	(3)
Fin.	136.	Public Utilities	(3)
Eco.	60.	Insurance	(3)
Fin.	126.	Public Finance	(3)
Eco.	133.	Labor Problems	(3)
Soc.	162.	Social Problems	(3)

Suggested Electives

Eco.	11, 12.	Marketing	(6)
I.E.	2, 3.	Industrial Management	(6)
Soc.	161.	Sociology	(3)
Govt.	62.	International Politics	(3)
Govt.	157.	Municipal Government	(3)
Govt.	158.	Municipal Administration	(3)

C. Major in Finance

SOPHOMORE YEAR

Eco.	3, 4.	Economics	(6)
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JUNIOR YEAR

Fin.	21, 22.	Corporation Finance	(6)
Fin.	29, 30.	Money and Banking	(6)
E.S.	145.	Statistical Method	(3)
E.S.	146.	Business Cycles and Forecasting	(3)

SENIOR YEAR

Fin.	123.	Investments	(3)
Fin.	126.	Public Finance	(3)
Fin.	135.	Transportation	(3)
Fin.	136.	Public Utilities	(3)
Eco.	60.	Insurance	(3)
Eco.	134.	Labor Problems	(3)

Suggested Electives

Acctg.	1, 2.	Accounting	(6)
Acctg.	113, 114.	Advanced Accounting	(6)
Eco.	107, 108.	Advanced Economics	(6)
Eco.	133.	Labor Problems	(3)
Fin.	131.	Foreign Trade and Exchange	(3)
Fin.	132.	Banking and Credit Policies	(3)
Fin.	171, 172.	Readings in Finance	(6)

D. Major in Accounting

SOPHOMORE YEAR

Eco.	3,	4.	Economics	.....	(6)
Acctg.	1,	2.	Accounting	.....	(6)

JUNIOR YEAR

Acctg.	115.		Cost Accounting	.....	(3)
Acctg.	118.		Advanced Cost Accounting	.....	(3)
Fin.	21,	22.	Corporation Finance	.....	(6)
Law	2.		Business Law	.....	(3)

SENIOR YEAR

Acctg.	113, 114.		Advanced Accounting	.....	(6)
Law	103.		Federal Tax Law	.....	(3)
Law	102.		Business Law	.....	(3)
Acctg.	120.		Auditing	.....	(3)

Suggested Electives

*Acctg.	171.		Readings in Accounting	.....	(3)
E.S.	145.		Statistical Method	.....	(3)
E.S.	146.		Business Cycles and Forecasting	.....	(3)
Eco.	107, 108.		Advanced Economics	.....	(6)
I.E.	2,	3.	Industrial Management	.....	(6)
C.E.	100.		Engineering Valuation and Economy	.....	(3)
*Fin.	123.		Investments	.....	(3)

* Essential for students preparing for C.P.A. work.

4. EDUCATION

Educ.	1.		Introduction to Education	.....	(3)
Educ.	20.		Educational Psychology	.....	(3)
Educ.	51.		Principles of High School Teaching	.....	(3)
Educ.	53.		Observation of Secondary School Teaching	.....	(3)
Educ.	54.		Practice Teaching of Sec. School Subjects	.....	(3)
Educ.	131.		History of Education in the United States	.....	(3)
Educ.	150.		Principles of Secondary Education	.....	(3)
Educ.	151.		Organization of Materials of Instruction	.....	(3)
			Electives	.....	(6)

5. ENGLISH

A. English Literature

Students looking forward to teaching English, or taking graduate courses for advanced degrees, should register for Engl. 123, 124, and elect eighteen additional hours from the list below. Students wishing to prepare a thesis for honors should elect in addition Engl. 81, 82.

Engl	81, 82.		Undergraduate Thesis	.....	(6)
Engl.	83, 84.		Readings in English Literature	.....	(6)
Engl.	123, 124.		Shakespeare and the Elizabethan Drama	.....	(6)
Engl.	125.		English Literature of the Romantic Era	.....	(3)
Engl.	126.		English Literature of the Victorian Era	.....	(3)
Engl.	130.		The Renaissance	.....	(3)
Engl.	131.		Milton	.....	(3)
Engl.	133.		Restoration and Augustan Literature	.....	(3)
Engl.	134.		Age of Johnson	.....	(3)

B. English and Journalism

Students who do not expect to specialize in English language and literature, but are interested in taking a major in English that may include courses in dramatics and journalism should arrange for twenty-four hours from the list below, twelve hours of which shall be from the "100" group. Students wishing to prepare a thesis for honors should elect in addition Engl. 81, 82.

Engl. 121.	Contemporary American Literature.....(3)
Engl. 122.	Contemporary English Literature.....(3)
Engl. 123, 124.	Shakespeare and the Elizabethan Drama.(6)
Engl. 125.	English Literature of the Romantic Era.(3)
Engl. 126.	English Literature of the Victorian Era.(3)
Engl. 6.	The Modern Essay.....(3)
Engl. 7.	The Short Story.....(3)
Engl. 8, 9.	English Literature .....(6)
Engl. 18, 19.	The Novel .....(6)
Engl. 20.	American Literature, 1607-1855 .....(3)
Engl. 21.	Modern American Literature.....(3)
Engl. 81, 82.	Undergraduate Thesis .....(6)
Engl. 83, 84.	Readings in English Literature .....(6)
Speech 61, 62.	Dramatics .....(3)
Journ. 15.	Editorial Writing and Modern Problems..(3)
Journ. 17.	Feature and Magazine Writing.....(3)
Journ. 18.	History of American Journalism.....(3)

C. Journalism

The prerequisites for a major in journalism are Engl. 1 and 2, Freshman Composition, or Engl. 3a and 3b, Types of World Literature.

The major proper is elected from the following courses:

	English Literature .....(6)
Journ. 11.	Newspaper Reporting and Writing.....(3)
Journ. 12.	Advanced Newspaper Reporting and Writing..(3)
Journ. 13.	Newspaper Editing and Copyreading.....(3)
Journ. 15.	Editorial Writing and Modern Problems.....(3)
Journ. 16.	Newspaper Problems and Policies.....(3)
Journ. 20.	Journalism Proseminar .....(3)
Journ. 1-4	<i>Brown and White</i> , four semesters.....(4)

The collateral courses required in the major in journalism are as follows: Eco. 3, 4, Economics; Soc. 161, 162, Sociology; Govt. 51, 52, American Government; Hist. 25, 26, Modern European History; or Hist. 129, 130, American Foreign Policy; and one of the following: Govt. 157, Municipal Government; Govt. 158, Municipal Administration; Eco. 133, 134, Labor Problems; or Eco. 11, Marketing, and Eco. 113, Advertising.

6. FINE ARTS

A student majoring in fine arts is expected to have the introductory courses, F. A. 11, Ancient and Medieval Art, and F. A. 12, The Art of the Italian Renaissance.

The major proper consists of the following:

F.A. 3, 4.	History of Architecture.....	(6)
F.A. 13.	The Art of the Northern Renaissance.....	(3)
F.A. 14.	Modern Art	(3)
F.A. 17, 18.	Criticism and Analysis of Art.....	(6)

Freehand Drawing (F. A. 5, 6) and Prints and Print Processes (F. A. 19) are not required of students majoring in fine arts but are recommended as a help toward appreciation. As collateral courses Mus. 3, 4, Appreciation of Music, and Phil. 109, The Theory of Art and of Beauty are advised. Students should have as much background in history as possible and a reading knowledge of a foreign language is valuable.

7. GEOLOGY

The prerequisites for students majoring in geology are: Geol. 10, Principles of Geology, (Geol. 16 and 17, Physiography, may be substituted for Geol. 10), Geol. 1, Mineralogy, Geol. 5, Petrology, Geol. 8, Historical Geology, altogether a total of 11 or more hours. These prerequisites should be completed by the end of the sophomore year.

The major proper consists of the following courses:

Geol. 107.	Non-metallic Economic Geology.....	(2)
Geol. 108.	Metallic Economic Geology.....	(3)
Geol. 109.	Paleontology	(3)
Geol. 110.	Stratigraphy and Sedimentation.....	(3)
Geol. 111.	Field Geology.....	(2)
Geol. 114.	Structural Geology	(3)
Geol. 116.	Geology Proseminar.....	(1)
Geol. 118.	Geology of Mineral Fuels.....	(3)

Certain variations in the major courses are advised depending upon the branch of geology in which the individual student is particularly interested. The same factor will affect materially the collateral courses advised. Students majoring in geology should consult the department head on these matters.

Geol. 109, 110, 114 should be taken during the junior year, and Geol. 107, 108, 111, and 118 during the senior year. The Geology Proseminar, Geol. 116, is taken during each semester of the senior year and is recommended also during each semester of the junior year. Other available courses are: Geol. 9, Engineering Geology, Geol. 18, Meteorology and Climatology, Geol. 101, Applied Mineralogy Laboratory, Geol. 117, Geochemistry, Geol. 123, Optical Crystallography, Geol. 124, Petrography, Geol. 128, Crystal Structure, and Geol. 171 and 172, Geological Problems.

8. GERMAN

The prerequisite for a major in German is Ger. 10, Goethe's Faust, Part I, or a knowledge of German which is equivalent.

The major proper consists of the following courses:

Ger. 22.	Conversation and Composition.....	(3)
Ger. 111, 112.	Nineteenth Century German Drama.....	(6)
Ger. 113, 114.	Lessing, Goethe, and Schiller.....	(6)
Ger. 115, 116.	The German Short Story.....	(6)

Shakespeare, Engl. 123, 124, and European History, Hist. 25, 26, are recommended as collateral courses. A thorough knowledge of Latin is desirable.

In addition to the collateral reading assigned in connection with the major courses, the students will be expected to have a knowledge of the history of German literature. A list of readings in English and German is furnished the student at the beginning of his major work.

9. GREEK

The major in Greek for those students who have begun Greek in college consists of the following courses:

Gk. 1, 2.	Elementary Greek.....	(6)
Gk. 3, 4.	Second-year Greek.....	(6)
Gk. 7.	Thucydides.....	(3)
Gk. 8.	Greek Tragedy.....	(3)
Gk. 15.	Homer and Herodotus.....	(3)
Gk. 16.	Plato.....	(3)
or equivalent courses as offered.		

Students who have presented the full amount of preparatory Greek at entrance will take Gk. 15, 16, 7, and 8 in the freshman and sophomore years, and Gk. 9, Dramatic Poetry, Gk. 10, Greek

Oratory, Gk. 11, Homer, Gk. 12, Lyric Poetry, or Gk. 13, Hellenistic Greek, during the last two years.

10. HISTORY AND GOVERNMENT

All students majoring in history and government are recommended to elect Hist. 25 and 26, European History. This should be done as early as possible.

The following groups are offered by the department in fulfillment of the major requirement:

a. The American History Group. Those selecting the American history group will be expected to register for (a) Hist. 13 and 14, United States History; (b) Hist. 27 and 28, European Expansion and Empire Building; (c) Hist. 129 and 130, American Foreign Policy, or Hist. 139 and 140, The American Civil War and the Reconstruction of the Union, or Hist. 149 and 150, Hispanic America in the Nineteenth and Twentieth Centuries; (d) Hist. 119 and 120, Senior Proseminar, which will study the British Empire before the American Revolution.

b. The European History Group. Those selecting the European history group will be expected to register for (a) Hist. 25 and 26, European History; (b) Hist. 31 and 32, English History, or Hist. 125 and 126, Social and Industrial England; (c) Hist. 27 and 28, European Expansion and Empire Building, or Hist. 119 and 120, the Senior Proseminar on the British Empire before the American Revolution; (d) Hist. 131 and 132, The Culture of the Middle Ages, or Hist. 133 and 134, The Culture of Modern Europe.

c. The Government Group. Those selecting the government group will be expected to register for (a) Govt. 51 and 52, American Government (National and State); (b) Govt. 163 and 164, Contemporary Political Thought; (c) twelve hours from the following group of courses: Govt. 61 and 62, Diplomacy in the Nineteenth and Twentieth Centuries and International Politics; Govt. 151, The American Constitutional System; Govt. 157 and 158, Municipal Government and Administration; Govt. 161 and 162, International Law; Hist. 119 and 120, Proseminar; Hist. 129 and 130, American Foreign Policy, Hist. 160, History of American Political Parties.

11. LATIN

Students majoring in Latin will be expected to present as preliminary work Lat. 1a, Pliny, or 1b, Vergil; Lat. 2, Horace; Lat. 4, Livy, and Lat. 13, Latin Drama, or equivalent. The major proper consists of the following courses: Lat. 105, Satire, Lat. 106, Roman Prose Writers of the Empire, Lat. 107, *Æneid*, Books VII-XII, and Lat. 108, Lucretius. The courses are given in alternate years, and are open to both juniors and seniors.

In addition to the courses specified above, students majoring in Latin must elect Lat. 125, Latin Literature in English Translation, and are advised to elect (preferably in the junior year) the course in Ancient History (Lat. 21 and 22). Instead of Lat. 22, majors may elect Lat. 121 and 122, the advanced courses in Roman History.

12. MATHEMATICS

A. The Major in Mathematics

The formal requirement of the major in mathematics is thirty semester hours of college credit in mathematics. This must include Math. 106, Advanced Calculus, and Math. 51, Advanced Algebra. The twelve hours advanced credit required by the regulations of the College of Arts and Science must be from mathematics courses given at Lehigh University other than Math. 1, 1a, 1b, 11, 11a, 12, 13, 14, 15, 16, 20, 23, and 40.

B. The Major in Mathematics and Astronomy

The major in mathematics and astronomy consists of thirty semester hours of college credit in mathematics and astronomy. It must include Math. 14, Intermediate Calculus, Astr. 2, General Astronomy, and Astr. 3, Practical Astronomy. The twelve hours advanced credit required shall not include Math. 1, 1a, 1b, 11, 12, 13, 14, 15, 16, or Astr. 1.

C. The Major in Actuarial Science

A major in actuarial science is offered within the department of mathematics. The graduate should be able to pass the examinations for associate in the Actuarial Society of America. The major consists of Math. 11, 12, 13, 14, 15, 40, 42, 43, 51, 124, Acctg. 1, 2, Fin. 25, Eco. 3, 4, 107, and 108.

13. PHILOSOPHY

The subject of philosophy may be chosen as a major on one of these two distinct bases:

(1) The student may recognize philosophy as the study of how to correlate his other studies, so that each of them may profit by the inspiration and the standard of criticism that comes from a unified outlook. Such a student should, as a rule, give about twelve hours to philosophy, including the History of Philosophy (6), with either Logic or Ethics (3), and either the Theory of Nature, the Theory of Art and of Beauty, or the Theory of Social Relations (3). This plan enables the student to avail himself fully of elective studies in other departments.

(2) The student who is drawn to philosophy as a culminating study may well give to it as many as twenty-four hours, including the subjects mentioned above, with six hours in Contemporary Philosophy and six hours in "Readings." The actual selection will vary with the individual student.

14. PHYSICS

Students majoring in physics should offer as prerequisite courses Phys. 12, Introduction to Physics, Phys. 16, General Physics, Phys. 17, General Physics Laboratory, or preferably, Phys. 22, Mechanics and Light, Phys. 23, Dynamics and Heat, and Phys. 24, Electricity and Magnetism, and mathematics including Elementary Calculus, Math. 13.

A total of at least twelve hours of physics should be elected during the junior and senior years from the following courses:

JUNIOR YEAR

Phys. 120.	Electric Oscillations and Waves.....(3)
Phys. 122.	Physical Optics and Spectroscopy.....(3)
Phys. 124.	Electric Discharge through Gases.....(3)
Phys. 126.	Pyrometry .....(3)

SENIOR YEAR

Phys. 160, 161.	Intro. to Modern Physical Theories.....(6)
Phys. 162, 163.	Intro. Theo. of Electricity and Magnetism.(6)
Phys. 164, 165.	Advanced Laboratory .....(2)

15. PSYCHOLOGY

The following recommendations are presented as a guide to majors in the department of psychology. The student may select any one of the following three fields.

I. General Psychology

Designed to prepare for graduate work in the field.

(1) Required courses.

a. In psychology:

Psych. 1.	Elementary Psychology	(3)
Psych. 102.	Aptitude Testing	(3)
Psych. 110.	Learning and Motivation	(3)
Psych. 131.	Neurological Aspects of Behavior	(1)
Psych. 132.	Sensory Psychology	(2)
Psych. 133.	Complex Psychological Processes	(3)

and a minimum of nine hours to be selected from:

Psych. 15.	Industrial Psychology	(3)
Psych. 16.	Psychology in Business ..	(3)
Psych. 51.	Readings in Psychology	(3)
Psych. 101.	Psychology of Industrial Personnel	(3)
Psych. 104.	Social Psychology	(3)
Psych. 108.	Genetic Psychology	(3)
Psych. 109.	Abnormal Psychology	(3)
Psych. 111.	Minor Research	(3)
Psych. 112.	Minor Research	(3)
Psych. 117.	Personality	(3)

b. In a non-psychological subject: a three-hour course in a supporting field approved by the head of the department.

(2) Collateral subjects recommended: Math. 42, Mathematics of Statistics, six hours of biology, and elementary physics.

II. Applied Psychology

Designed to prepare for psychological work in business and industry.

(1) Required courses.

a. In psychology:

Psych. 1.	Elementary Psychology	(3)
Psych. 102.	Aptitude Testing	(3)

and in addition six hours to be selected from:

Psych. 104.	Social Psychology	(3)
Psych. 110.	Learning and Motivation	(3)
Psych. 131.	Neurological Aspects of Behavior	(1)
Psych. 132.	Sensory Psychology	(2)
Psych. 133.	Complex Psychological Processes	(3)

and six hours to be selected from:

Psych. 15.	Industrial Psychology	(3)
Psych. 16.	Psychology in Business	(3)
Psych. 101.	Psychology of Industrial Personnel	(3)
Psych. 111.	Minor Research	(3)
Psych. 112.	Minor Research	(3)
Psych. 117.	Personality	(3)

b. In non-psychological subjects: not more than six hours in advanced subjects in allied fields. These must be approved by the head of the department.

(2) Collateral subjects recommended for this group are selected, in conference with the head of the department, in accord with the interests and goals of each student.

III. Social Science Psychology

Designed to give cultural background, or to prepare for social service or governmental work.

(1) Required courses:

a. In psychology:

Psych. 1.	Elementary Psychology	(3)
Psych. 104.	Social Psychology	(3)

and in addition six hours to be selected from:

Psych. 108.	Genetic Psychology	(3)
Psych. 110.	Learning and Motivation	(3)
Psych. 131.	Neurological Aspects of Behavior	(1)
Psych. 132.	Sensory Psychology	(2)
Psych. 133.	Complex Psychological Processes	(3)

and six hours to be selected from:

Psych. 102.	Aptitude Testing	(3)
Psych. 109.	Abnormal Psychology	(3)
Psych. 117.	Personality	(3)

b. In non-psychological subjects: not more than six hours in advanced subjects in allied fields. These must be approved by the head of the department.

(2) Collateral subjects recommended for this group are selected in conference with the head of the department. They are designed to provide for the specific needs of students who are interested in cultural content; social sciences; governmental, journalistic, economic, or social service work.

16. ROMANCE LANGUAGES

A. French

The prerequisites for students majoring in French are: Fr. 21, Seventeenth Century French Literature, and Fr. 22, Eighteenth Century French Literature.

The major proper consists of the following courses:

Fr. 31, 32.	Nineteenth Century French Literature.....	(6)
Fr. 101.	French Literature before the Seventeenth Century	(3)
Fr. 102.	Contemporary French Literature	(3)
Fr. 103, 104.	Proseminar	(6)

Recommended as collateral courses are the following:

Gk. 100.	Greek Literature in English Translation..(3)
Lat. 125.	Latin Literature in English Translation..(3)
Engl. 123, 124.	Shakespeare and the Elizabethan Drama..(6)
Hist. 133, 134.	The Culture of Modern Europe.....(6)

The student will be expected to complete supplementary readings, the list of which he will receive at the beginning of his major work, and to correlate the knowledge gained in courses and readings through the use of some recommended history of French literature.

B. Spanish

The prerequisites for students majoring in Spanish are Sp. 21, 22, Spanish Novels and Plays.

The major proper consists of the following courses:

Span. 101.	Spanish Fiction of the Sixteenth and Seventeenth Centuries .....(3)
Span. 102.	Spanish Drama of the Sixteenth and Seventeenth Centuries .....(3)
Span. 103, 104.	Proseminar .....(6)
Span. 111, 112.	Spanish-American Literature .....(6)

Recommended as collateral courses are the following:

Gk. 100.	Greek Literature in English Translation..(3)
Lat. 125.	Latin Literature in English Translation..(3)
Engl. 123, 124.	Shakespeare and the Elizabethan Drama..(6)
Hist. 133, 134.	The Culture of Modern Europe.....(6)
Hist. 149.	Hispanic America in the Nineteenth Century .....(3)

In addition to the outside readings and reports required in connection with these courses, the student will be expected to acquire a knowledge of the history of Spanish literature as a whole.

Special Regulations for English

Students in the College of Arts and Science who persistently use poor English may be reported at any time to the dean of the College. He may require that they take additional English without credit toward graduation. Toward the end of the junior year each junior in the College of Arts and Science must report to the department of English for an exercise in impromptu writing. Students found seriously deficient in this test are reported to the dean of the College, who may require that they take additional English without credit toward graduation.

**The College of
Business Administration**



THE COLLEGE OF BUSINESS ADMINISTRATION

Administrative Officers

Clement Clarence Williams, *President of the University*

Neil Carothers, *Dean of the College of Business
Administration*

Wray Hollowell Congdon, *Dean of Undergraduates*

George Bartlett Curtis, *Registrar*

Earl Kenneth Smiley, *Director of Admissions*

Faculty

Carl Elmer Allen.....	<i>Accounting</i>
Ward Leslie Bishop.....	<i>Finance</i>
Frederick Alden Bradford.....	<i>Finance</i>
Elmer Clark Bratt.....	<i>Economic Statistics</i>
Neil Carothers.....	<i>Economics and Sociology</i>
Roy Burford Cowin.....	<i>Accounting</i>
Clarence Danhof.....	<i>Economics</i>
Herbert Maynard Diamond.....	<i>Economics and Sociology</i>
Thomas Frederick Jones.....	<i>Economics</i>
Henry August Kriebel.....	<i>Accounting</i>
Robert Wallace Mayer.....	<i>Finance</i>
Gordon Wells McKinley.....	<i>Economics</i>
Louis Reed Tripp.....	<i>Economics</i>

THE COLLEGE OF BUSINESS ADMINISTRATION

The purpose of the curriculum in business administration is to provide a thorough and systematic training in the fundamentals of business. The College of Business Administration at Lehigh is comparatively new, and it has been possible to build the curriculum on the basis of the experience of other colleges of the kind.

The College of Business Administration undertakes, in its four-year curriculum, to provide a training in the fundamentals of business that will give the student an intelligent understand-

ing of business principles, an ability to analyze industrial facts, and a habit of thought that will enable him to cope with the problems that increasing executive responsibilities will bring him in later life. A college course cannot make business executives and industrial managers out of inexperienced college students, and no college course can provide a substitute for the training and experience which are to be gained only from actual contact with the complex problems of business. The College of Business Administration does not pretend to furnish such a substitute but to lay a foundation upon which a career in the field of business activity may be built.

In accordance with this plan of training in fundamentals, the student is required to learn the basic principles that underlie all business. No student is permitted to omit the courses in economics, economic history, accounting, corporation finance, money and banking, and statistical method which are fundamental to all business. Many students come to college with their choice of a future profession or field of business already determined, although this choice is often predicated upon the most inadequate grounds. The insistence of the business administration curriculum on an elementary training in all the fundamentals gives the student an invaluable means of discovering his real abilities and making a final choice of a profession. A major function of the curriculum in business administration is to aid students in their efforts to discover their best talents.

In addition to this principle of a generalized training in business fundamentals, there is an equally important principle that the training as a whole shall offer an education commensurate with the standards of a university. The curriculum permits no student to devote himself exclusively to business subjects. He must acquire at least a rudimentary acquaintance with the cultural and humanitarian aspects of the world around him, as well as at least a brief contact with science. Consequently a large part of the curriculum is devoted to work in liberal and scientific subjects. In the freshman year only one course is taken in the College of Business Administration. In the sophomore year the curriculum offers only two courses in business administration. Throughout the entire four years' work there is emphasis on the social aspects of the subjects considered. If a student develops alongside his business work a special interest in some

such field as languages or science, he is given opportunity, through electives or substitutions, to pursue this special line. Many students have, at graduation, done three or four years work in languages or chemistry or some such subject outside the business curriculum proper.

It has been emphasized that training in fundamentals constitutes the major objective of the curriculum. Specialization in one field of business at the expense of general training is not possible, while purely vocational and wholly commercial aspects of business are excluded from the curriculum. But every student has opportunity in the last two years, and especially in the senior year, to concentrate his work in some special field of business. The curriculum is so arranged that every student necessarily specializes in some degree, but these requirements give the student a wide choice of fields of work and combinations of courses.

Students planning careers in accounting take elementary accounting in their sophomore year. In their junior year they take cost accounting and advanced accounting, as well as the required courses in statistics, corporation finance, and money and banking, all of which are essential courses in connection with accounting. In the senior year they take one or more of the advanced courses in accounting and in addition usually elect investments, public finance, and business law. A student following this program of work has not specialized in accounting to the detriment of his general training, but he has the necessary background for a career in this field. Graduates of the College of Business Administration have been consistently successful in accounting, both public and private. Holders of the degree are eligible for work toward a C. P. A. certificate in any state.

Those students preparing for the managerial phases of business select courses to fit in with their particular individual needs. Normally they order their program so as to include labor problems, marketing, advertising, and industrial management. Students planning a career in merchandising usually arrange their curriculum to include the junior and senior courses in marketing, selling and sales management, and advertising, as well as business law and courses in psychology and in English. Students preparing for careers in the field of finance or investments take the courses in investments, public finance, banking and credit policies, and public utilities.

For students who are interested in the social and public aspects of business, with a view to pursuing graduate work in economics or to entering government service, an individual program is worked out from the courses in advanced economics, sociology, labor problems, and courses in government and history in the College of Arts and Science. It is now widely recognized that business curricula of the better type offer excellent preparation for law. Graduates of the College of Business Administration are accepted without question by the outstanding law schools of the country.

The College of Business Administration has certain other distinguishing features. One of these is the limited enrollment. The graduating class is relatively small, and all its members are known personally to the teaching staff. This gives every student exceptional opportunity to consult with individual professors in reference to his future work.

Perhaps the most distinctive feature of the work at Lehigh in business administration is the character of the class-work. Much of the work of the curriculum is taken in the College of Engineering and the College of Arts and Science, while students of these two Colleges in very large numbers avail themselves of the courses given in the College of Business Administration. There is no segregation of students by colleges, and students in business administration take their courses in competition with students trained in liberal arts and in the exact sciences. This condition has a marked influence on the standards of work and the quality of the student.

In times of normal business activity, students who have made creditable records may reasonably expect to receive one or more offers of positions before the date of their graduation. The College of Business Administration enjoys happy relations with many of the country's leading industries. Representatives regularly visit the campus to engage the service of students graduating in business administration. The University assumes no responsibility for finding positions for its graduates, but every effort is made by the College and by the university placement service to put its graduating students in touch with desirable opportunities for employment.

Graduates of this curriculum receive the degree of Bachelor of Science in Business Administration.

BUSINESS ADMINISTRATION

The Curriculum in Business Administration

FIRST SEMESTER			FRESHMAN YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Eco. 1	Ind. Evolution	3	Eco. 50	Eco. Geography	3	
Engl. 1	English Comp.	3	Engl. 2	English Comp.	3	
Math. 1b	General Math.	3	Math. 40	Math. of Finance	3	
	Foreign Language ¹	3		Foreign Language ¹	3	
	Science ²	3		Science ²	3	
Mil. 1	Military Science	2	Mil. 2	Military Science	2	
P.E. 1	Physical Education	—	P.E. 2	Physical Education	—	
M.R.Phil. 10	Student Philosophy	—				
			17			17

¹ Six semester hours for the year of a single foreign language.

² Biol. 7 and 8, or Geol. 16 and 17, or Physics 12 and 16, or Chem. 2 and 12 (or 3 and 14) and Chem. 20.

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER	
Eco. 3	Economics	3	Eco. 4	Economics	3	
Acctg. 1	Accounting	3	Acctg. 2	Accounting	3	
	English or Foreign Language ¹	3		English or Foreign Language ¹	3	
Hist. 13 or 25	History	3	Hist. 14 or 26	History	3	
or 27	History	3	or 28	History	3	
Psych. 1	El. Psychology	3	Psych. 16	Psych. in Bus.	3	
Math. 43	Math. of Ins.	3	Math. 23	Adv. Gen. Math.	3	
Mil. 3	Military Science	2	Mil. 4	Military Science	2	
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—	
			17			17

¹ Six semester hours for the year of English or of any single foreign language.

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER	
Fin. 21	Corp. Finance	3	Fin. 22	Corp. Finance	3	
Fin. 29	Money & Banking	3	Fin. 30	Money & Banking	3	
E.S. 145	Stat. Method	3	E.S. 146	Business Cycles	3	
Acctg. 113	Adv. Accounting	3	Acctg. 114	Adv. Accounting	3	
Acctg. 115	Cost Accounting	3	Acctg. 118	Adv. Cost Acctg.	3	
Soc. 51	Social Insti.	3	Law 2	Business Law	3	
Eco. 133	Labor Problems	3	Eco. 134	Labor Problems	3	
Eco. 11	Marketing	3	Eco. 12	Marketing	3	
Govt. 51	Am. Govt.	3	Govt. 52	Am. Govt.	3	
or 157	or Mun. Govt.	3	or 158	or Mun. Adm.	3	
	Elective	3		Elective	3	
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—	
			18			18

SUMMER

Mil. 9 or 19..Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER	
Acctg. 113	Adv. Accounting	3	Acctg. 114	Adv. Accounting	3	
Eco. 60	Econ. of Ins.	3	Acctg. 120	Auditing	3	
Eco. 107	Adv. Economics	3	Eco. 108	Adv. Economics	3	
Eco. 113	Advertising	3	Eco. 114	Sell. & Sales Mgt.	3	
Eco. 133	Labor Problems	3	Eco. 134	Labor Problems	3	
E.S. 147	Stat. Analysis	3	E.S. 148	Adv. Bus. Cycles	3	
Fin. 123	Investments	3	Fin. 124	Investments	3	
Fin. 131	For. Exchange	3	Fin. 126	Public Finance	3	
Fin. 135	Transportation	3	Fin. 132	Bkg. & Cr. Pol.	3	
I.E. 2	Industrial Mgt.	3	Fin. 136	Public Utilities	3	
Law 103	Fed. Tax Law	3	I.E. 3	Industrial Mgt.	3	
Soc. 161	Sociology	3	Law 102	Business Law	3	
	Elective	3	Soc. 162	Sociology	3	
P.E. 7	Physical Education	—		Elective	3	
			18	P.E. 8	Physical Education	—
						18

**The College of
Engineering**

THE COLLEGE OF ENGINEERING

Administrative Officers

Clement Clarence Williams, *President of the University*

Alfred Copeland Callen, *Dean of the College of Engineering*

Wray Hollowell Congdon, *Dean of Undergraduates*

George Bartlett Curtis, *Registrar*

Earl Kenneth Smiley, *Director of Admissions*

Faculty

Bernard Altshuler	<i>Physics</i>
Edward Delbert Amstutz.....	<i>Chemistry and Chemical Engineering</i>
Harold Victor Anderson.....	<i>Chemistry and Chemical Engineering</i>
Joel Furness Bailey.....	<i>Mechanical Engineering</i>
Carl Daniel Baumann.....	<i>Physics</i>
Paul Leverne Bayley.....	<i>Physics</i>
Jacob Lynford Beaver.....	<i>Electrical Engineering</i>
George Carlton Beck.....	<i>Chemistry and Chemical Engineering</i>
Sylvanus A. Becker.....	<i>Civil Engineering</i>
Charles Edward Berger.....	<i>Physics</i>
Loyal Vivien Bewley.....	<i>Electrical Engineering</i>
Charles Clarence Bidwell.....	<i>Physics</i>
Robert Dominick Billinger.....	<i>Chemistry and Chemical Engineering</i>
Cledo Brunetti.....	<i>Electrical Engineering</i>
Robert August Buerschaper.....	<i>Physics</i>
Thomas Edward Butterfield.....	<i>Mechanical and Industrial Engineering</i>
Allison Butts.....	<i>Metallurgical Engineering</i>
Alfred Copeland Callen.....	<i>Mining Engineering</i>
Preston Banks Carwile.....	<i>Physics</i>
John Robert Connelly.....	<i>Mechanical and Industrial Engineering</i>
Alpha Albert Diefenderfer.....	<i>Chemistry and Chemical Engineering</i>
Gilbert Everett Doan.....	<i>Metallurgical Engineering</i>
Howard Eckfeldt.....	<i>Mining Engineering</i>
William Joseph Eney.....	<i>Civil Engineering</i>
James Van Deusen Eppes.....	<i>Mechanical Engineering</i>
*Maurice Ewing.....	<i>Geophysics</i>
Warren Walter Ewing.....	<i>Chemistry and Chemical Engineering</i>
Frank Junior Fornoff.....	<i>Chemistry and Chemical Engineering</i>
Walton Forstall, Jr.....	<i>Mechanical Engineering</i>
Austin Rogers Frey.....	<i>Physics</i>

* Absent on Leave.

John H. Frye, Jr.	<i>Metallurgical Engineering</i>
Merton Otis Fuller	<i>Civil Engineering</i>
Howard Dietrich Gruber	<i>Electrical Engineering</i>
Roger Shinkle Hawley	<i>Chemistry and Chemical Engineering</i>
Thomas Huger Hazlehurst	<i>Chemistry and Chemical Engineering</i>
Earl Heins	<i>Chemistry and Chemical Engineering</i>
Nelson Sherk Hibshman	<i>Electrical Engineering</i>
Thomas Timings Holme	<i>Mechanical and Industrial Engineering</i>
Arthur Thomas Ippen	<i>Civil Engineering</i>
Thomas Edgar Jackson	<i>Mechanical and Industrial Engineering</i>
Cyril Dewey Jensen	<i>Civil Engineering</i>
Bruce Gilbert Johnston	<i>Civil Engineering</i>
Joseph Adreon Keller	<i>Mechanical and Industrial Engineering</i>
Arthur Warner Klein	<i>Mechanical and Industrial Engineering</i>
Henry Carl Ivar Knutson	<i>Electrical Engineering</i>
William Stanley Lanterman	<i>Physics</i>
Charles Rozier Larkin	<i>Physics</i>
Fred Viall Larkin	<i>Mechanical and Industrial Engineering</i>
Harold Samuel Levenson	<i>Chemistry and Chemical Engineering</i>
William Anthony McGrath	<i>Chemistry and Chemical Engineering</i>
John Clewell Mertz	<i>Chemistry and Chemical Engineering</i>
Archie Roscoe Miller	<i>Electrical Engineering</i>
Douglas Ewart Mode	<i>Electrical Engineering</i>
Harvey Alexander Neville	<i>Chemistry and Chemical Engineering</i>
Harry Gordon Payrow	<i>Civil Engineering</i>
Max Petersen	<i>Physics</i>
Chester Howard Powers	<i>Mechanical Engineering</i>
Charles Henry Reichardt	<i>Chemistry and Chemical Engineering</i>
Raymond Frederick Schultz	<i>Chemistry and Chemical Engineering</i>
Frederic Allen Scott	<i>Physics</i>
Earl James Serfass	<i>Chemistry and Chemical Engineering</i>
Kenneth Berlin Shiffert	<i>Physics</i>
Charles Wellington Simmons	<i>Chemistry and Chemical Engineering</i>
Eric Spencer Sinkinson	<i>Mining Engineering</i>
Hilton A. Smith	<i>Chemistry and Chemical Engineering</i>
Judson Gray Smull	<i>Chemistry and Chemical Engineering</i>
Benjamin Lichty Snavely	<i>Physics</i>
William August Stauth	<i>Mining Engineering</i>
James Harvey Steele	<i>Chemistry and Chemical Engineering</i>

Rollaston George Stiles.....	<i>Physics</i>
Bradley Stoughton.....	<i>Metallurgical Engineering</i>
Robert Daniel Stout.....	<i>Metallurgical Engineering</i>
Paul Theodore Weinert Strub.....	<i>Chemistry and Chemical Engineering</i>
Milton Caleb Stuart.....	<i>Mechanical and Industrial Engineering</i>
Hale Sutherland.....	<i>Civil Engineering</i>
Edwin Raymond Theis.....	<i>Chemistry and Chemical Engineering</i>
Eugene Henry Uhler.....	<i>Civil Engineering</i>
Cecil Francis Warner.....	<i>Mechanical Engineering</i>
David Rawley Williams.....	<i>Mechanical Engineering</i>

THE COLLEGE OF ENGINEERING

The College of Engineering offers curricula in

Chemical Engineering
Chemistry
Civil Engineering
Electrical Engineering
Engineering Physics
Industrial Engineering
Mechanical Engineering
Metallurgical Engineering
Mining Engineering
Combined Engineering and Arts

The Curricula

The engineering curricula were formulated on the basis of an intensive study, by the faculty of Lehigh University, of the problems of technical education and the changing needs of modern industry. This study led to the conclusion that greater emphasis than heretofore should be placed upon the fundamentals of engineering, including mathematics, physics, chemistry, and theoretical and applied mechanics, and less emphasis upon the highly specialized details of engineering practice; and that the engineer must know something of the social sciences, that is, the sciences which deal with human relations, and be familiar with the methods of business organization and administration. The various engineering curricula accordingly emphasize the fundamental

sciences and those humanistic subjects which are a part of the equipment of every well educated man and which are now recognized as essential to the proper training of engineers because of their practical applications in industrial, business, and civic life.

Advanced courses in military science and tactics are optional with other courses subject to the approval of the director of the curriculum concerned.

Among the noteworthy features of the curricula the following may be mentioned:

(1) Provision is made for a uniform freshman year in the College of Engineering, and the students' definite choices among the specialized engineering curricula are deferred until the spring of the freshman year, when it is hoped they may be prepared, after a year of college work, and on the basis of guidance in engineering conferences, to choose wisely; students who at registration in the fall already have preferences for one curriculum or another are asked to indicate such preferences, but the indications noted at that time are regarded as merely tentative and do not commit the students in any way.

(2) The work of the first two years is fairly self-contained. To those who for one reason or another are unable to complete their engineering training, it affords preparation for careers as draftsmen, electricians, surveyors, shop foremen, or assistants in industrial laboratories or plants. Students who complete in full the work of the first two years and who then withdraw from the University are given a certificate of work completed.

(3) Near the close of the second year every sophomore is required to take a general engineering aptitude test to determine his ability to apply to engineering problems the principles of chemistry, mathematics, and physics studied during his first two years. Students whose showing in this examination is unsatisfactory and whose work for the first two years has been poor may be compelled to withdraw from the College of Engineering and to change into other curricula better suited to their aptitudes and interests.

(4) Since the University recognizes that an engineer cannot be trained by purely academic process, the degree awarded upon graduation is Bachelor of Science in the particular division of engineering that has been studied, for example, B.S. in Civil Engineering. The successful completion of one year of graduate

study leads to the degree of Master of Science in the particular division of engineering studied. Professional degrees are conferred after five years of acceptable experience, as noted below.

Engineering Conferences

Throughout the freshman year the directors of curricula conduct weekly conferences to which groups of students must go in turn for orientation, motivation, and vocational guidance. During the sophomore year these conferences are continued in the curriculum of the student's choice. By means of these conferences and by the appraisal made by each curriculum director throughout the sophomore year an estimate of the student's aptitude for further engineering work is attempted.

The Uniform Freshman Year

An outline follows of the work of the freshman year, uniform for all engineering students. For schedules of the work of the upper three years, varying according to the several specialized curricula, see the subsequent pages.

FIRST SEMESTER			FRESHMAN YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Chem. 1 or 3.	Chemistry	2	Chem. 8	Stoichiometry	1	
Chem. 11 or 13.	Chemistry Lab.	2	Chem. 20	Qual. Analysis	3	
C.E. 1	Engr. Drawing	2	C.E. 2	Engr. Drawing	2	
Engl. 1	English	3	Engl. 2	English	3	
Math. 11	Alg. & Anal. Geom.	3	Math. 12	Anal. Geom. & Cal.	3	
Phys. 22	Mech. & Light.	4	Math. 20	Mechanics	4	
Math. 20	or Mechanics					
Mil. 1	Military Science	2	Mil. 2	Military Science	2	
E.C. 1	Eng. Conferences.	—	E.C. 2	Eng. Conferences.	—	
P.E. 1	Physical Education	—	P.E. 2	Physical Education	—	
M.R.Phil. 10.	Student Philosophy	—				
		18			18	

SUMMER SESSION

For students who at the end of the freshman year elect civil engineering, electrical engineering, engineering physics, industrial engineering, mechanical engineering, or mining engineering

C.E. 6.....Land and Topographic Surveying..... 4

For students who elect chemical engineering, chemistry, or metallurgical engineering, there is no required summer session following the freshman year.

Selection of Specialized Curricula

In the spring of his freshman year each engineering student must announce his selection of the particular engineering curriculum which he desires to continue. This announcement must be made by members of the class of 1945 not later than April 6, 1941.

Inspection Trips

Inspection trips to industrial plants are a required part of specific courses in the various curricula in engineering. Written reports or examinations are required. These trips are under the general direction and supervision of the faculty committee on inspection trips. They are generally held during the senior year and involve an average expense of about \$25.00. The location of the University in the center of industrial activities of various kinds furnishes unusual opportunities for visits of inspection to engineering plants.

Combined Arts and Engineering Curricula

Students who can afford the extra time and money are urged to spend five years in their collegiate training and to cover the requirements for the degrees of B.A. and B.S. in engineering. Under the five-year plan a student registers in the College of Arts and Science for four years, earning the B.A. degree on completion of a program which includes, along with specific B.A. training, the fundamental mathematical, scientific, and engineering subjects of the engineering curriculum of his choice. The fifth year is spent in the College of Engineering, carrying on a program leading to the degree of B.S. in his selected branch of engineering. This is usually the senior year curriculum of the chosen branch of engineering.

An engineering student, who decides at any stage of his course that he wishes to work for both the B.A. and B.S. degrees, may register in one of the colleges concerned for a period of years, and complete the combined requirements of both degrees in five or six years, depending upon the program followed before the decision is made. His curriculum is so arranged that the work for one degree may be finished at the end of a four-year period, and the work for the subsequent degree at the close of the fifth or sixth year.

Graduates of liberal arts colleges planning to become candidates for a baccalaureate degree in engineering are referred to page 30.

Professional Engineering Degrees

Graduates of the various technical curricula of Lehigh University with the degree of Bachelor of Science in Civil Engineering, Mechanical Engineering, Electrical Engineering, Metallurgical Engineering, Mining Engineering, Chemical Engineering, and Industrial Engineering, may be candidates for the corresponding professional degrees, namely, Civil Engineer (C.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.), Metallurgical Engineer (Met.E.), Mining Engineer (E.M.), Chemical Engineer (Ch.E.), and Industrial Engineer (I.E.). To qualify for a professional degree, a candidate must submit evidence of having had, since graduation, at least five years of acceptable experience in the field of engineering corresponding to the degree desired, and must submit also an acceptable thesis, the subject of which must be approved in advance by the department concerned. In those cases where the degree applied for does not correspond in subject to the candidate's undergraduate training, evidence must be furnished that any such scholastic deficiency has been satisfied.

Graduates of Lehigh University with the degree of Master of Science in one of the engineering fields may be candidates for the appropriate professional degrees on the same basis as holders of a baccalaureate degree. A candidate who has had a year of acceptable graduate work at Lehigh or elsewhere may count the graduate year toward the partial satisfaction of the requirement of five years of acceptable experience.

Declaration of candidacy for professional degrees must be made on or before January 1 of the year in which the candidate expects to receive his degree. Application blanks may be obtained from the registrar. The thesis must be submitted in duplicate (one copy for the department and one for the University Library) on or before March 15 and should be sent directly to the department concerned. Formal application for a professional degree, accompanied by the graduation fee of \$10, must be made before May 15 of the year in which the degree is to be conferred. Professional degrees are conferred only in June.

THE CURRICULUM IN CHEMICAL ENGINEERING

The curriculum in chemical engineering is designed to prepare the student for the profession of chemical engineer, which includes the design, construction, operation, and management of manufacturing establishments in which chemical products are made. Such substances include paper, gasoline and other petroleum products, cement, coke, gas, dyes, electrochemical products, paints, rubber, leather, foods, and other substances. In addition to the primary requirement of chemistry in all its branches, the training of the chemical engineer includes a thorough knowledge of physics and mathematics, and a sound understanding of such fundamentals of chemical, mechanical, and electrical engineering as will make him a discriminating research, operating, or sales engineer.

After chemical investigations furnish a better understanding of known process or develop novel processes or novel methods, it is the particular province of chemical engineering to carry them forward into industrial production. The curriculum is not planned to turn out a specialist restricted to any one type of product; the aim is rather to develop expertness in the sciences and fundamental unit manufacturing processes which underlie all chemical engineering. Some familiarity with factory methods under actual working conditions is acquired through contact with operations in nearby plants. Frequent visits for observation and report are made to manufacturing plants in the immediate neighborhood and in the Philadelphia and New York districts.

Approved elective sequences through the junior and senior years are provided as variants of the regular curriculum. These are:

BUSINESS ADMINISTRATION

Fin. 25 Corporation Finance	Acctg. 4 Accounting
E.S. 145 Statistical Method	E.S. 146 Bus. Cycles & Fore.

MATHEMATICS-PHYSICS

Math. 106 ..Advanced Calculus	Math. 124 ..Theory of Errors
Math. 111 ..Differential Equations	Math. 112 ...Differential Equations
or Phys. 160.Mod. Phys. Theories	or Phys. 161.Mod. Phys. Theories

BIOCHEMISTRY

Biol. 52 Bacteriology	Biol. 153 Advanced Bacteriology
Biol. 1 Biology	Chem. 171 ..Indus. Biochemistry

EDUCATION

Educ. 1 Intro. to Teaching	Psych. 1 Psychology
Educ. 51 Prin. of H.S. Teaching	Educ. 20 Educ. Psychology

THE CURRICULUM IN CHEMICAL ENGINEERING

FRESHMAN YEAR

See page 81

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Chem. 30	...Quant. Analysis	3	Chem. 31	...Quant. Analysis	3	
Chem. 41	...Quant. Anal. Conf.	1	Chem. 45	...Quant. Anal. Conf.	1	
Eco. 3	...Economics	3	Eco. 4	...Economics	3	
Ger. 1, 3, or 7	German	3	Ger. 2, 4, or 7	German	3	
Math. 13	...Calculus	3	Math. 14	...Inter. Calculus	3	
Phys. 24	...Elec. & Magnetism	4	Phys. 23	...Dynamics & Heat.	4	
Mil. 3	...Military Science	2	Mil. 4	...Military Science	2	
E.C. 3	...Eng. Conferences	—	E.C. 4	...Eng. Conferences	—	
P.E. 3	...Physical Education	—	P.E. 4	...Physical Education	—	
		19			19	

SUMMER

Chem. 39....Assaying, Coal, Gas, and Oil Analysis..... 4

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER	
Chem. 6	Inorg. Chemistry	3	Chem. 7	Physical Chem.	3	
Ch.E. 78	Chemical Eng.	3	Ch.E. 79	Chemical Eng.	3	
Chem. 150	Organic Chemistry	3	Chem. 151	Organic Chemistry	3	
Chem. 165	Org. Chem. Lab.	2	Chem. 167	Org. Chem. Lab.	2	
Ger. 7	German	3	M.E. 29	Heat Engines	3	
Met. 23	Fer. Metallurgy	} 3	Met. 54	Met. of Zinc, etc.2	} 3	
Met. 83	Met. Prob. 1		Met. 164	& Met. Prob. 1		
	or Elective			or Elective		
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—	
		17			17	

SUMMER

M.E. 24....Engineering Laboratory 4
Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER		SENIOR YEAR		SECOND SEMESTER	
Chem. 158 ..	Adv. Org. Chem.. }	3	Chem. 99 ...	Research Lab.	2
Chem. 171 ..	or Ind. Biochem. }		Chem. 179 ..	History of Chem.	1
Ch.E. 180 ...	Chem. Eng. Lab.. }	3	Ch.E. 181 ...	Chemical Eng.	3
Chem. 190 ...	Physical Chem.	3	Ch.E. 185 ...	Chem. Eng. Prac.	1
Chem. 193 ...	Phys. Chem. Lab.. }	2	Chem. 194 ...	Phys. & E'trochem.	3
E.E. 58	Electrical Mach.... }	3	Chem. 197 ..	Electrochem. Lab.. }	1
	Elective	3	C.E. 9	Mech. of Materials ...	3
P.E. 7	Physical Education	—	E.E. 59	Dynamo Lab.	1
				Elective	3
			P.E. 8	Physical Education	—
		17			18

THE CURRICULUM IN CHEMISTRY

The chemist needs a deep insight into the phenomena of matter and into the many processes in which matter undergoes change. The graduate in chemistry may use his education to discover and investigate hitherto unknown combinations of matter and of energy, or he may apply known facts and principles to new and useful purposes in manufacture or in the arts. In preparation for a professional career, the training is thorough in fundamentals and leads to a comprehensive understanding of the scientific and industrial achievements of chemistry.

The curriculum offers an education primarily in chemistry, with considerable training in related sciences and with an adequate grounding in chemical engineering principles. The modern conception of an education in chemistry includes a coordinate study of physics and mathematics. In addition to these so-called physical sciences, other studies, planned to aid and develop the thought-processes and culture of the student, are embodied in the curriculum. It is believed by many practicing chemists and industrial chemists that an undergraduate course such as this one which includes a liberal allotment of study in the humanities is the best preparation for a successful career both in pure science and in the business application of chemistry.

Approved elective sequences adapted to particular objectives are provided as described under chemical engineering above. Other approved sequences may be arranged.

Without reducing the professional training in chemistry, physics, and mathematics, the curriculum can be adapted to include the educational training required for state certification toward teaching these sciences in public high schools.

Since the freshman and sophomore years of this curriculum and of the curriculum in chemical engineering are the same, it is possible for a student to change from one curriculum to the other at the end of either semester of the sophomore year.

Seniors in the curriculum in chemistry may arrange to make the supervised visits to industrial plants required in the curriculum in chemical engineering.

ENGINEERING

THE CURRICULUM IN CHEMISTRY

FRESHMAN YEAR

See page 81

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Chem. 30	Quant. Analysis	3	Chem. 31	Quant. Analysis	3	
Chem. 41	Quant. Anal. Conf.	1	Chem. 45	Quant. Anal. Conf.	1	
Eco. 3	Economics	3	Eco. 4	Economics	3	
Ger. 1, 3, or 7	German	3	Ger. 2, 4, or 7	German	3	
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3	
Phys. 24	Elec. & Magnetism	4	Phys. 23	Dynamics & Heat.	4	
Mil. 3	Military Science	2	Mil. 4	Military Science	2	
E.C. 3	Eng. Conferences	—	E.C. 4	Eng. Conferences	—	
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—	
		19			19	

SUMMER

Chem. 39....Assaying, Coal, Gas, and Oil Analysis..... 4

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER	
Chem. 6	Inorg. Chemistry	3	Chem. 7	Physical Chem.	3	
Chem. 150	Organic Chemistry	3	Ch.E. 80	Ind. & Eng. Chem.	3	
Chem. 165	Org. Chem. Lab.	2	Chem. 151	Organic Chemistry	3	
Engl. 4, 41	English	3	Chem. 166	Org. Chem. Lab.	3	
Speech 30	or Fund. of		Engl. 5, 41	English	3	
	Speech		Speech 31	or Bus.		
Ger. 3 or 7	German	3		Speaking		
Geol. 10	Prin. of Geology	3	Ger. 4, 7 or 10	German	3	
Fin. 25	or Corp. Fin.		Acctg. 4	or Accounting		
	or Elective			or Elective		
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—	
		17			18	

SUMMER

Chem. 50....Industrial Employment
Mil. 9 or 19... or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER	
Chem. 158	Adv. Org. Chem.	3	Chem. 97	Research Lab.	3	
Chem. 171	or Ind. Biochem.		Chem. 137	Adv. Anal. Chem.	3	
Chem. 190	Physical Chem.	3	Chem. 159	Adv. Org. Chem.	3	
Chem. 193	Phys. Chem. Lab.	2	Chem. 179	History of Chem.	1	
Met. 23	Ferrous Met.	3	Chem. 194	Phys. & E'trochem.	3	
Met. 83	& Met. Prob.		Chem. 197	Electrochem. Lab.	1	
	or Elective			Elective	3	
	Electives	6	P.E. 8	Physical Education	—	
P.E. 7	Physical Education	—			17	
		17			17	

THE CURRICULUM IN CIVIL ENGINEERING

The purpose of this curriculum is to give instruction in those general and scientific subjects which form the foundation of all engineering, and a special training in the field of civil engineering, which includes the building of highways, railroads, harbors, docks and terminals, bridges, buildings, subways, tunnels, water supply and purification plants, sewage systems and sewage disposal plants, water power developments and surveys. To enable the civil engineering graduate to deal with allied technical problems arising in most civil engineering projects of today, the curriculum includes certain special studies in the fields of mechanical and electrical engineering, geology, and metallurgy. Courses in economics, accounting, and finance have been added since it is essential that the graduate have a knowledge of the fundamentals of business. In preparation for civic responsibility, each student in the senior year studies the basic concepts of our American democracy and of the political philosophies which challenge democracy. In the senior year also there is opportunity for the consideration of these and other topics in the field of the humanities through the medium of elective courses.

The work of the first three years deals chiefly with the scientific and mathematical basis of engineering practice. In the fourth year the application of these basic principles is studied in structural, hydraulic, sanitary, and transportation engineering, the major divisions of the wide field of civil engineering. Sanitary engineering is highly specialized and the student who wishes to practice in this field should elect the sanitary option, which, in addition to the basic material covered in the general option, gives consideration also to those fundamentals of chemistry and bacteriology requisite to knowledge of water purification and of sewage and waste disposal. A program of studies, planned to suit individual needs, known as the administrative option, is available for those students who wish to prepare themselves for the superintendence of construction, the administration of public works, dealing in building material, general contracting, and other work requiring operational organization and economy of management.

The positions open to new graduates include those of inspector, timekeeper, and engineering assistant on construction work, instrument man on surveys, draftsman, computer, and engineering apprentice.

ENGINEERING

THE CURRICULUM IN CIVIL ENGINEERING

FRESHMAN YEAR

See page 81

SUMMER

C.E. 6.....Land and Topographic Surveying..... 4

FIRST SEMESTER			SOPHOMORE YEAR			SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.
Eco. 2	Economics	3	Eco. 4	Economics	3	Eco. 4	Economics	3
Geol. 10	Prin. of Geology..	3	Geol. 9	Eng. Geology	3	Geol. 9	Eng. Geology	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3	Math. 14	Inter. Calculus	3
Phys. 23	Dyn. & Heat	4	Phys. 24	Elec. & Magnetism	4	Phys. 24	Elec. & Magnetism	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2	Mil. 4	Military Science	2
General Option			General Option			General Option		
C.E. 16	Highway Engr..3}	3	C.E. 11	Railroad Engr..3}	3	C.E. 11	Railroad Engr..3}	3
or Sanitary Option			or Sanitary Option			or Sanitary Option		
Chem. 30	Quant. Analysis.3}	4	Biol. 50	San. Bact. 3}	—	Biol. 50	San. Bact. 3}	—
Chem. 41	Quant. An. Conf.1}		E.C. 4	Eng. Conferences..		E.C. 4	Eng. Conferences..	
E.C. 3	Eng. Conferences..	—	P.E. 4	Physical Education	—	P.E. 4	Physical Education	—
P.E. 3	Physical Education	—						
18 or 19			18					

SUMMER

C.E. 31.....Route Surveying..... 2

FIRST SEMESTER			JUNIOR YEAR			SECOND SEMESTER		
C.E. 8	Mech. of Materials	4	Acctg. 4	Acctg. or Elective.	3	Acctg. 4	Acctg. or Elective.	3
C.E. 10	Mat. Testing Lab..	1	C.E. 12	Hydraulics	3	C.E. 12	Hydraulics	3
Fin. 25	Corp. Finance	3	C.E. 14	Hydraulics Lab..	1	C.E. 14	Hydraulics Lab..	1
M.E. 29	Heat Engines	3	C.E. 19	Adv. Mech. of Mat.	3	C.E. 19	Adv. Mech. of Mat.	3
General Option			Met. 21	Engr. Met.	2	Met. 21	Engr. Met.	2
C.E. 35	Adv. Surveying 3	3	General Option			General Option		
E.E. 50	Dyn. & Motors..2		C.E. 15	Stresses	4	C.E. 15	Stresses	4
E.E. 51	Dynamo Lab...1	1	E.E. 52	Alt. Currents..2	2	E.E. 52	Alt. Currents..2	7
or Sanitary Option			E.E. 53	Dynamo Lab...1		E.E. 53	Dynamo Lab...1		1
Chem. 150	Organic Chem...3	7	or Sanitary Option			or Sanitary Option		
E.E. 58	Electrical Mach.3	3	C.E. 15a	Stresses	3	C.E. 15a	Stresses	3
E.E. 59	Dyn. Lab. Comb.1		Chem. 151	Organic Chem. 3	Chem. 151	Organic Chem. 3	3	
P.E. 5	Physical Education		—	P.E. 6	Physical Education	—	P.E. 6	Physical Education
17 or 18			19 or 18			19 or 18		

SUMMER

C.E. 29.....Industrial Employment
Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR			SECOND SEMESTER		
C.E. 118	Structural Theory.	3	C.E. 101	Foundations	2	C.E. 101	Foundations	2
C.E. 125	Reinforced Conc.	3	C.E. 126	Concrete Lab.	1	C.E. 126	Concrete Lab.	1
	Design	3	C.E. 129	San. Engr. Des..	3	C.E. 129	San. Engr. Des..	3
C.E. 128	Sanitary Engr.	3	C.E. 130	San. Engr. Lab..	1	C.E. 130	San. Engr. Lab..	1
Elective (non-technical)	.....	3	Engl. 42	Tech. Writing or }	3	Engl. 42	Tech. Writing or }	3
General Option			Elective (non-technical)	.....		Elective (non-technical)	.....	
C.E. 119	Struc. Design ...3}	6	General Option			General Option		
Govt. 163	Cont. Pol. Tho't.3}		C.E. 41	C.E. Proseminar.2}	8	C.E. 41	C.E. Proseminar.2}	8
or Sanitary Option			C.E. elective (C.E. 100 or 124			C.E. elective (C.E. 100 or 124		
C.E. 119a	Struc. Design...1}	7	or 131 or 132		3	or 131 or 132		3
C.E. 16a	Highway Engr..2}		or 50)	3}		or 50)	3}	
Govt. 157	Municipal Govt..3}	—	Govt. 164	Cont. Pol. Tho't 3}	7	Govt. 164	Cont. Pol. Tho't 3}	7
P.E. 7	Physical Education		or Sanitary Option			or Sanitary Option		
			C.E. 41a	C.E. Proseminar.1		C.E. 41a	C.E. Proseminar.1	
			C.E. 131	Adv. San. Engr..3		C.E. 131	Adv. San. Engr..3	
			Govt. 158	Municipal Adm. 3}		Govt. 158	Municipal Adm. 3}	
			P.E. 8	Physical Education	—	P.E. 8	Physical Education	—
18			18 or 17			18 or 17		

ADMINISTRATIVE OPTION: In the sophomore, junior, and senior years there is opportunity for a program of twelve credit hours in subjects pertaining to business, industrial management, and social organization, obtained by substitution of an approved program for certain of the work in the general option.

THE CURRICULUM IN ELECTRICAL ENGINEERING

The electrical engineer is one who understands the science and art of economically "directing the sources of electrical power in nature for the uses and conveniences of man." He may design, manufacture, install, or operate electrical machinery and equipment, manage plants and electric systems, or engage in the promotion of engineering projects.

The object of this curriculum is to give instruction in those general and scientific subjects which underlie all the branches of engineering, and to give special training in those technical and business subjects which experience shows are most essential in the equipment of the electrical engineer. In seeking to accomplish this object the department puts chief emphasis upon mastery of the mathematical-physical principles and thoroughness in the analysis of problems.

The curriculum provides a balanced allotment of time in each of four principal divisions: (1) mathematics and the basic sciences, (2) electrical engineering, (3) allied branches of engineering, and (4) non-technical subjects in arts and business. In order to make maximum use of the available time, the electrical courses are highly coordinated with respect to classroom and laboratory work; concurrent courses are designed to augment and supplement each other; and consecutive courses to extend and build upon the previous courses.

In recognition of different talents and inclinations among individuals, and of specialization in industry, three separate options are offered in the Senior year: (1) the "Power Option" for those interested in the technical aspects of design, operation, and development of electrical machinery and power systems; (2) the "Communication Option" for those interested in the technical aspects of wire or radio communications; and, (3) the "General Option" for those less interested in technical applications and more inclined towards commercial, managerial and executive assignments. The work of the first three years and some of that in the senior year is identical for each option; so that all graduates will have had the same basic work. Thus, although a student elects a particular option, he has a foundation sufficiently fundamental to enable him to enter any branch of electrical engineering.

ENGINEERING

THE CURRICULUM IN ELECTRICAL ENGINEERING

FRESHMAN YEAR

See page 81

SUMMER

C.E. 6.....Land and Topographic Surveying 4

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.		
Met. 21	...Metallurgy	2	E.E. 32	...Direct Cur. Mach.	4		
Met. 81	...Met. Problems	1	E.E. 33	...D. C. Lab.	2		
Phys. 24	...Elec. & Magnetism	4	Phys. 23	...Dynamics & Heat.	4		
Math. 13	...Calculus	3	Math. 14	...Inter. Calculus	3		
Eco. 3	...Economics	3	Eco. 4	...Economics	3		
Mil. 3	...Military Science	2	Mil. 4	...Military Science	2		
Speech 30	...Fund. of Speech	3	E.C. 4	...Eng. Conferences	—		
E.C. 3	...Eng. Conferences	—	P.E. 4	...Physical Education	—		
P.E. 3	...Physical Education	—					
		18					18

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER		
E.E. 34	...A.C. Circuits	3	E.E. 36	...A.C. Machines	3		
E.E. 35	...A.C. Circuits Lab.	1	E.E. 37	...A.C. Mach. Lab.	2		
Math. 106	...Adv. Calculus	3	E.E. 40	...Electronics	3		
C.E. 9	...Mech. of Materials	3	C.E. 13	...Hydraulics	2		
C.E. 10	...Mat. Testing Lab.	1	C.E. 14	...Hydraulics Lab.	1		
M.E. 22	...Heat Engines	3	M.E. 23	...Heat Engines	3		
Phys. 110	...Adv. Elec. Lab.	1	Phys. 111	...Adv. Elec. Lab.	1		
	*General Study	3		*General Study	3		
P.E. 5	...Physical Education	—	P.E. 6	...Physical Education	—		
		18					18

* See Register, bottom of page 99.

SUMMER

E.E. 24.....Industrial Employment
Mil. 9 or 19.. or R.O.T.C. 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER		
M.E. 21	...Engineering Lab.	1	M.E. 25	...Engineering Lab.	1		
E.E. 17	...Proseminar	1	E.E. 18	...Proseminar	1		
E.E. 38	...A.C. Machines	3		Arts or Bus. Elec.	3		
E.E. 39	...A.C. Machine Lab.	2					

POWER OPTION

E.E. 131	...Elec. & Mag. Fields	3	E.E. 132	...Electric Transients	3
E.E. 133	...Transmission Lines	3	E.E. 134	...Trans. Line Trans.	3
E.E. 135	...Symmetrical Comp.	3	E.E. 136	...System Stability	2
Math. 121	...Analytic Mech.	3	E.E. 137	...Adv. Mach. Theory	3
			E.E. 138	...Transients Lab.	1

COMMUNICATION OPTION

E.E. 131	...Elec. & Mag. Fields	3	E.E. 132	...Electric Transients	3
E.E. 141	...Radio Commun.	3	E.E. 142	...Radio Commun.	3
E.E. 143	...Wire Commun.	3	E.E. 144	...Wire Commun.	3
Math. 121	...Analytic Mech.	3	E.E. 145	...Electro-acoustics	3

GENERAL OPTION

E.E. 101	...Electric Power Sta.	3	E.E. 102	...Distr. Systems	3
E.E. 103	...Industrial App.	3	E.E. 104	...Electric Traction	3
I.E. 2	...Ind. Management	3	I.E. 3	...Ind. Management	3
	Business Elective	3	Acctg. 4	...Accounting	3

19

17

THE CURRICULUM IN ENGINEERING PHYSICS

The curriculum in engineering physics has been developed over a number of years to meet a demand on the part of industry and government for men trained in the fundamentals and technique of scientific research.

Industrial expansion, development and even the establishment of entirely new industries have repeatedly followed upon research. The widespread recognition of this fact in recent years has led to the organization of laboratories of research in nearly every industry great and small, with a consequent demand for suitably trained men.

The amazing expansion in the electrical industries is almost wholly the result of organized research. This statement applies more or less to every major industry. The products of research include the incandescent lamp, the x-ray tube, telephone, radio, automobile, airplane, talking movies, optical glass, etc.

While the training in this curriculum is intended to be in fundamentals primarily, it is still consciously practical. While it is practical it is not permitted to lose sight of the fact that today's theory may yield tomorrow's practice.

Graduates from this curriculum find places in government laboratories and in the laboratories of the electrical, communication, automotive, and other industries. A few students continue their studies in the academic field, pursuing research as members of the staff of a college or university.

The curriculum includes a liberal number of electives, wherein each student may develop his best talents by particular attention to topics of special interest. Such topics constitute a liaison with particular branches of technology, among which may be mentioned electro-acoustics, telephone engineering, geophysical practice, etc. Each student is urged to cultivate some such special interest but only to that moderate degree which still permits him to lay a thoroughly adequate basis of fundamentals.

ENGINEERING

THE CURRICULUM IN ENGINEERING PHYSICS

FRESHMAN YEAR

See page 81

SUMMER

C.E. Land and Topographic Surveying. 4

FIRST SEMESTER			SOPHOMORE YEAR			SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.
Eco. 3	Economics	3	Eco. 4	Economics	3	Eco. 4	Economics	3
Ger. 1 or 3	German	3	Ger. 2 or 4	German	3	Ger. 2 or 4	German	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3	Math. 14	Inter. Calculus	3
Phys. 23	Dynamics & Heat.	4	Phys. 24	Elec. & Magnetism	4	Phys. 24	Elec. & Magnetism	4
Chem. 6	Inorg. Chemistry	3	Chem. 7	In. & Phys. Chem.	3	Chem. 7	In. & Phys. Chem.	3
Geol. 1	or Mineralogy	3	Geol. 10	or Geology	3	Geol. 10	or Geology	3
Mil. 3	Military Science	2	Mil. 4	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Eng. Conferences	—	E.C. 4	Eng. Conferences	—	E.C. 4	Eng. Conferences	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—	P.E. 4	Physical Education	—
			18			18		

FIRST SEMESTER			JUNIOR YEAR			SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.
Math. 106	..Adv. Calculus	3	Math. 121	..Anal. Mechanics	3	Math. 121	..Anal. Mechanics	3
Phys. 110	..Adv. Elec. Lab.	1	Phys. 111	..Adv. Elec. Lab.	1	Phys. 111	..Adv. Elec. Lab.	1
Phys. 122	..Physical Optics	3	Phys. 126	..Pyrometry	3	Phys. 126	..Pyrometry	3
Phys. 162	..Th. Elec. & Mag.	3	Phys. 163	..Th. Elec. & Mag.	3	Phys. 163	..Th. Elec. & Mag.	3
E.E. 50	Dyn. & Motors	2	E.E. 52	Alt. Currents	2	E.E. 52	Alt. Currents	2
E.E. 51	& Dyn. Lab.	1	E.E. 53	& Dyn. Lab.	1	E.E. 53	& Dyn. Lab.	1
M.E. 22	or Heat Eng.	3	M.E. 23	or Heat Eng.	3	M.E. 23	or Heat Eng.	3
Ger. 3	German	3	Ger. 4	German	3	Ger. 4	German	3
Fr. 1	or French	3	Fr. 2	or French	3	Fr. 2	or French	3
	Elective	3		Elective	3		Elective	3
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—	P.E. 6	Physical Education	—
			19			19		

SUMMER

Phys. 50.....Industrial Employment
Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR			SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.
Phys. 124	..El. Dis. in Gases	3	Phys. 120	..Electric Waves	3	Phys. 120	..Electric Waves	3
Phys. 160	..Mod. Theories	3	Phys. 161	..Mod. Theories	3	Phys. 161	..Mod. Theories	3
Phys. 164	..Advanced Lab.	2	Phys. 165	..Advanced Lab.	2	Phys. 165	..Advanced Lab.	2
C.E. 9	Mech. of Mat.	3	Chem. 194	..Phys. Chem.	3	Chem. 194	..Phys. Chem.	3
Chem. 190	or Ph. Chem.	3	Chem. 197	..& Electrochem	1	Chem. 197	..& Electrochem	1
Chem. 193	& Lab.	2		Lab.	1		Lab.	1
Geol. 111	or Field Geol.	2	E.E. 122	or El. Trans.	3	E.E. 122	or El. Trans.	3
Geol. 114	& Str. Geol.	2	Geol. 110	or Stratig'y	2	Geol. 110	or Stratig'y	2
Math. 111	or Adv. Dif. Eq.	3	Math. 112	or Adv. Dif. Eq.	3	Math. 112	or Adv. Dif. Eq.	3
Met. 21	or Eng. Met.	2	Math. 124	or Theo. of Er.	3	Math. 124	or Theo. of Er.	3
Met. 81	& Met. Prob.	1	Met. 21	or Eng. Met.	2	Met. 21	or Eng. Met.	2
	Electives	6	Met. 81	& Met. Prob.	1	Met. 81	& Met. Prob.	1
P.E. 7	Physical Education	—		Electives	6		Electives	6
			17			17		

THE CURRICULUM IN INDUSTRIAL ENGINEERING

Industrial engineering has to do with the organization, operation, and management of manufacturing plants, public utilities, and operating, holding, and management companies. Broadly considered, it covers the engineering aspects of plant location, plant layout, routing, production control, maintenance, stores, and inspection; the economic aspects of employment, employee training, promotion, wage payment, bonus, safety and welfare, insurance, and old age pensions; and the commercial aspects of purchasing, marketing, credit, accounting, and finance.

Industrial enterprises depend on sound financing, adequate accounting, and intelligent forecasting of economic developments. Technical skill and engineering efficiency are primary requisites, but these alone are not sufficient. There is a demand by industry for men who have had not only a thorough training in the fundamentals of engineering, but also a knowledge of the problems of accounting, finance, statistics, and management which every enterprise encounters. The object of the curriculum in industrial engineering is to add a knowledge of the basic facts of economics, finance, and management to the technical knowledge and scientific spirit that come from the study of engineering.

The curriculum in industrial engineering is primarily an engineering curriculum supplemented by courses in economics and business administration, so chosen as to provide a thorough training in the fundamental principles of economics, industrial management, corporation financing, and business practice. The curriculum is designed primarily to meet the needs of that considerable body of students who intend to enter industries essentially technical, whether public utilities or manufacturing plants, but who intend to go into the administrative departments.

ENGINEERING

THE CURRICULUM IN INDUSTRIAL ENGINEERING

FRESHMAN YEAR

See page 81

SUMMER

C.E. 6.....Land and Topographic Surveying..... 4

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Eco. 3	Economics	3	Eco. 4	Economics	3	
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3	
M.E. 1	Elem. Mch. Design	3	M.E. 4	Elem. Mch. Design	3	
M.E. 2	El. Heat Engines	3	M.E. 5	Heat Engines	3	
Phys. 23	Dynamics & Heat	4	Phys. 24	Elec. & Magnetism	4	
Mil. 3	Military Science	2	Mil. 4	Military Science	2	
E.C. 3	Eng. Conferences	—	E.C. 4	Eng. Conferences	—	
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—	
		18			18	

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER	
Acctg. 4	Accounting	3	C.E. 32	Mech. of Materials	3	
Fin. 25	Corp. Finance	3	E.E. 52	Alt. Currents	2	
E.E. 50	Dyn. & Motors	2	E.E. 53	Dynamo Lab.	1	
E.E. 51	Dynamo Lab.	1	I.E. 13	Industrial Eng.	3	
M.E. 40	Machine Design	3	M.E. 19	Eng. Lab.	1	
Psych. 1	Psychology	3	M.E. 33	Thermodynamics	2	
	Arts Elective	3	Psych. 15	Industrial Psych.	3	
P.E. 5	Physical Education	—		Arts Elective	3	
		18	P.E. 6	Physical Education	—	
		18			18	

SUMMER

I.E. 1.....Industrial Employment
Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER	
E.S. 145	Stat. Method	3	E.S. 146	Business Cycles	3	
Acctg. 115	Cost Accounting	3	Law 102	Business Law	3	
Met. 21	Metallurgy	2	Min. 15	Mining Eng.	3	
Met. 81	Met. Problems	1	I.E. 112	Personnel Adm.	3	
I.E. 111	Industrial Adm.	3		Business Elective	3	
	Business Elective	3		Elective	3	
	Elective	3	P.E. 8	Physical Education	—	
P.E. 7	Physical Education	—			18	
		18			18	

THE CURRICULUM IN MECHANICAL ENGINEERING

Mechanical engineering deals with the design, construction, installation, and operation of machinery necessary for the economical and advantageous use of power, and with the management of industries and organizations manufacturing and using power-driven equipment. The high degree of technical skill and efficiency essential to the work of research, design, construction, and operation, which underlies mechanical engineering practice, necessarily prescribes a training based on the fundamental sciences of chemistry, physics, and mathematics.

Aptitude and skill in the interpretation and application of the basic technical sciences are, however, not sufficient. In addition the engineer must acquire an understanding of the influences of his profession on social institutions and traditions. To this end the curriculum requires the student to register for courses in the College of Arts and Science or the College of Business Administration or both, during each of the four years. Specialization in particular fields of mechanical engineering is not undertaken. Class room courses are supplemented with laboratory exercises which are designed to give the student a maximum of freedom in demonstration.

The curriculum is broad, highly technical, and designed to meet the needs of young men interested in the scientific aspects of industry. Emphasis is placed on the fundamental principles underlying the numerous fields of mechanical engineering, including aerodynamics, aeronautics, air conditioning, automotive engineering, and Diesel engines. The young graduate ordinarily enters a graduate apprenticeship in a public utility, manufacturing, or operating organization where opportunity is provided for his development in research, design, operation, sales, or administration, depending upon his interests and aptitudes and the opportunities available.

ENGINEERING

THE CURRICULUM IN MECHANICAL ENGINEERING

FRESHMAN YEAR

See page 81

SUMMER

C.E. 6.....Land and Topographic Surveying..... 4

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.	
Eco. 3	Economics	3	Eco. 4	Economics	3	
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3	
M.E. 1	Elem. Mch. Design	3	M.E. 4	Elem. Mch. Design	3	
M.E. 2	El. Heat Engines	3	M.E. 5	Heat Engines	3	
Phys. 23	Dynamics & Heat	4	Phys. 24	Elec. & Magnetism	4	
Mil. 3	Military Science	2	Mil. 4	Military Science	2	
E.C. 3	Eng. Conferences	—	E.C. 4	Eng. Conferences	—	
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—	
		18			18	

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER	
C.E. 32	Mech. of Materials	3	E.E. 50	Dyn. & Motors	2	
Fin. 25	Corp. Finance	3	E.E. 51	Dynamo Lab.	1	
I.E. 13	Industrial Eng.	3	Math. 121	Anal. Mechanics	3	
Math. 106	Adv. Calculus	3	M.E. 11	Engineering Lab.	1	
M.E. 9	Engineering Lab.	1	M.E. 35	Thermodynamics	2	
M.E. 23	Thermodynamics	2	M.E. 40	Machine Design	3	
	Arts Elective	3	Met. 21	Metallurgy	2	
P.E. 5	Physical Education	—	Met. 81	Met. Problems	1	
		18		Arts Elective	3	
				P.E. 6	Physical Education	—
						18

SUMMER

I.E. 1.....Industrial Employment
Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER	
C.E. 33	Hydraulics	3	Acctg. 4	Accounting	3	
E.E. 52	Alt. Currents	2	E.E. 54	Electrical Eng.	2	
E.E. 53	Dynamo Lab.	1	E.E. 55	Dynamo Lab.	1	
M.E. 114	Engineering Lab.	2	M.E. 123	Power Plants	3	
M.E. 117	Air Cond. & Refrig.	3	M.E. 118	Engineering Lab.	2	
M.E. 121	Adv. Mach. Design	3	M.E. 122	Adv. Mach. Design	3	
Met. 33	Metallurgy Lab.	1	Met. 34	Metallurgy Lab.	1	
	Elective	3		Elective	3	
P.E. 7	Physical Education	—	P.E. 8	Physical Education	—	
		18			18	

THE CURRICULUM IN METALLURGICAL ENGINEERING

Metallurgical Engineering formerly signified the production and refining of metals for industrial and military use. More recently the applications of science to alloying, rolling and forging, heat treatment, machining, and welding, the later stages in the manufacturing processes, have widened the field. A sound general education, coupled with thorough grounding in basic science and general engineering, remain, however, the wisest preparation for the specialist in any of these fields.

Outside of the basic studies in science, general engineering, and metallurgy required of all for the degree, flexibility is provided in the curriculum to permit its adaptation to the individual abilities, prospects, and plans of the student by limited "Electives" and "Professional Subjects." Thus, outside of the essential basic subjects, he may develop in the direction of research with advanced courses in chemistry, physics, mathematics, German, and research; toward plant operation with electives such as labor problems, psychology, and industrial management; or toward the business side of metallurgy with courses such as advanced economics, sociology, and accounting—all without jeopardizing the soundness and adequacy of his basic engineering education.

The hours called "General Study" are for the purpose of providing the student with some mature understanding of the social and human aspects of the world in which he will make his way as an engineer. Typical "General Study" Options are listed opposite. The student's choices of elective courses will be approved, of course, only after individual consultation with the curriculum director.

Electives may also be used in preparation for electrometallurgy, which includes four subjects in the department of electrical engineering and an additional course in electrometallurgy instead of one of the courses in iron and steel.

ENGINEERING

THE CURRICULUM IN METALLURGICAL ENGINEERING

FRESHMAN YEAR

See page 81

FIRST SEMESTER		SOPHOMORE YEAR		SECOND SEMESTER	
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.
Chem. 36	Quant. Analysis	2	Eco. 4	Economics	3
Chem. 48	Quant. Anal. Conf.	1	Math. 14	Inter. Calculus	3
Eco. 3	Economics	3	Met. 33	Metallurgy Lab.	1
Math. 13	Calculus	3	Met. 61	Met. Problems	1
Met. 51	Intro. to Met.	3	Phys. 23	Dynamics & Heat.	4
Phys. 24	Elec. & Magnetism	4		*General Study	3
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Eng. Conferences	—	E.C. 4	Eng. Conferences	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		18			17

SUMMER

Chem. 39....Assaying, Coal, Gas, and Oil Analysis..... 4

FIRST SEMESTER

JUNIOR YEAR

SECOND SEMESTER

C.E. 9	Mech. of Materials	3	Chem. 7	Inorg. & Phys. Chem.	3
C.E. 10	Mat. Testing Lab.	1	Geol. 10	Prin. of Geology	3
Engl. 3a	Types of World Lit.	3	Met. 52	Met. of Iron & Steel	3
Geol. 2	Mineralogy	2	Met. 62	Met. Problems	1
Met. 125	Electrochemistry	2	Met. 131	Metallography	3
Met. 130	Phys. Metallurgy	3		*General Study	3
Met. 135	Elec. Chem. Lab.	1		**Elective	3
	*General Study	3	P.E. 6	Physical Education	—
P.E. 5	Physical Education	—			19
		18			

SUMMER

Met. 49.....Industrial Employment

Mil. 9 or 19.. or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER

SENIOR YEAR

SECOND SEMESTER

Chem. 190	Phys. Chemistry	3	M.E. 29	Heat Engines	3
E.E. 58	Elec. Machinery	3	Met. 54	Met. of Zinc, Aluminum, etc.	2
E.E. 59	Dynamo Lab.	1	Met. 140	Met. Colloquium	1
Met. 53	Met. of Copper, Lead, etc.	3	Met. 152	Adv. Met. I. & S.	3
Met. 139	Met. Colloquium	1	Met. 164	Met. Problems	1
Met. 163	Met. Problems	1		†Professional subjs.	5
	‡Professional subjs.	3		Elective	3
	Elective	3	P.E. 8	Physical Education	—
P.E. 7	Physical Education	—			18
		18			

* Suggested General Study Options (others may be chosen, all must be approved).

- History of Civilization.
Hlst. 13 and 14, U. S. History, or Hlst. 125 and 126, Social and Ind. England.
- History of Science and Thought.
Phil. 3, Introduction to Philosophy, or Gk. 99, Ancient Science, or Phil. 14, Logic and the Scientific Method.
- Literature and the Fine Arts.
Engl. 3b, Types of World Lit., or Engl. 121 and 122, Cont. Lit., or Fine Arts 11 and 12, Ancient and Medieval Art and Art of the Italian Renaissance.
- Social Science.
Soc. 161 and 162, Sociology, or Eco. 107 and 108, Advanced Economics, or Eco. 133 and 134, Labor Problems.
- Science.
Biol. 13, Human Biology, or Psych. 1, Introduction to Psychology, or Astr. 1, Descriptive Astronomy.

† Must be chosen with written approval of curriculum director.

** In preparation for electrometallurgy, E.E. 50 and 51 are elected here, and in senior year E.E. 40, 52 and 53, 54 and 55, and Met. 108; E.E. 58 and 59 are omitted and Met. 152 is not required.

THE CURRICULUM IN MINING ENGINEERING

Mining engineering concerns itself with the search for, extraction from the ground, and the initial preparation of the minerals and rocks that are needed to meet the demands of our modern civilization. So basic is the mining industry, so dependent on it are all individuals and industries, that ours has been called a "mineral civilization". Three great classes of materials are provided by the mining engineer: mineral fuels, including coal, petroleum and natural gas; ores of the metals; non-metallics, such as slate, limestone, gypsum, sand and gravel, and scores of others.

All the operations at the mine are within the responsibility of the mining engineer. The actual work of extraction may be only one of his activities, for he may also have to deal with exploration, plant construction, transportation, preparation and processing, and all phases of mine administration. Modern mining has become, in many cases, a mass-production industry. The mechanization of mines has gone forward with startling rapidity. Electrical applications are found in every phase of the industry. The need for engineering training was never more important.

The curriculum in mining engineering includes the basic science common to all branches of engineering—mathematics, physics, chemistry and mechanics. The study of geology is begun in the sophomore year. During the last two years a thorough and progressive training is given in the principles of mining and the methods used in extraction. Special attention is directed to the mechanization of mine operations; to mine ventilation, transportation, economics and administration; and to coal preparation and ore dressing. Technical courses in civil, electrical and mechanical engineering form a part of this advanced work.

Interwoven with the technical program is a series of required courses and electives which offers great flexibility in caring for the needs of the individual student. Wise planning permits, without sacrifice of technical strength, a basic program in business administration consisting of such courses as labor problems, cost accounting, statistical method, money and banking, and corporation finance. Another, desiring to specialize in geology, finds ample opportunity to build a strong program in this field, including geophysics. On the other hand the student who wishes more work in technology can have it, or if he prefers additional courses in general subjects his desires can be met.

ENGINEERING

THE CURRICULUM IN MINING ENGINEERING

FRESHMAN YEAR

See page 81

SUMMER

C.E. 6 Land and Topographic Surveying..... 4

FIRST SEMESTER			SOPHOMORE YEAR		SECOND SEMESTER		
Number	Title	Cr.Hrs.	Number	Title	Cr.Hrs.		
Chem. 30	Quant. Analysis	3	Eco. 4	Economics	3		
Chem. 41	Quant. Anal. Conf.	1	Geol. 8	Historical Geol.	3		
Eco. 3	Economics	3	Math. 14	Inter. Calculus	3		
Geol. 10	General Geology	3	Min. 6	Mine Surveying	3		
Math. 13	Calculus	3	Phys. 24	Elec. & Magnetism	4		
Phys. 23	Dynamics and Heat	4	Mil. 4	Military Science	2		
Mil. 3	Military Science	2	E.C. 4	Eng. Conferences	—		
E.C. 3	Eng. Conferences	—	P.E. 4	Physical Education	—		
P.E. 3	Physical Education	—					
		19			18		

SUMMER

C.E. 31 Route Surveying 2

FIRST SEMESTER			JUNIOR YEAR		SECOND SEMESTER		
C.E. 9	Mech. of Materials	3	Acctg. 4	Accounting	3		
C.E. 10	Mat. Testing Lab.	1	C.E. 13	Hydraulics	2		
Geol. 1	Mineralogy	3	C.E. 14	Hydraulics Lab.	1		
	*General Study	3	Engl. 42	Technical Writing	3		
M.E. 29	Heat Engines	3		*General Study	3		
Met. 21	Metallurgy	2	Geol. 5	Petrology	3		
Met. 81	Met. Problems	1	Min. 22	Mining Methods	3		
Min. 21	Min. Fundamentals	3	P.E. 6	Physical Education	—		
P.E. 5	Physical Education	—					
		19			18		

SUMMER

Min. 20.....Industrial Employment
Mil. 9 or 19... or Reserve Officers' Training Corps Camp..... 3

FIRST SEMESTER			SENIOR YEAR		SECOND SEMESTER		
E.E. 50	Dyn. & Motors	2	C.E. 30	Struct. Design	3		
E.E. 51	Dynamo Lab.	1	E.E. 52	Alt. Currents	2		
Min. 3	Ore Dressing & Coal Prep.	3	E.E. 53	Dynamo Lab.	1		
Min. 103	Mine Ventilation	2	Min. 104	Haulage, Hoisting & Pumping	3		
Min. 105	Mine Administra.	3	Min. 106	Mining Economics	3		
	Approved Elective	6		Approved Elective	5		
P.E. 7	Physical Education	—	P.E. 8	Physical Education	—		
		17			17		

* Chosen from the following fields: History of Civilization; History of Science and Thought; Literature and the Fine Arts; Social Sciences; Science. See footnote at bottom of page 99 for suggested courses.

The Graduate School

THE GRADUATE SCHOOL

Administrative Officers

Clement Clarence Williams, *President of the University*
 Tomlinson Fort, *Dean of the Graduate School*
 George Bartlett Curtis, *Registrar*
 Earl Kenneth Smiley, *Director of Admissions*
 Robert Pattison More, *Executive Secretary of the
 Graduate Faculty*

Faculty

Carl Elmer Allen.....	<i>Accounting</i>
Harold Victor Anderson.....	<i>Chemistry</i>
Joel Furness Bailey.....	<i>Mechanical Engineering</i>
Allen Jennings Barthold.....	<i>Romance Languages</i>
Paul Leverne Bayley.....	<i>Physics</i>
Claude Gillette Beardslee.....	<i>Moral and Religious Philosophy</i>
Jacob Lynford Beaver.....	<i>Electrical Engineering</i>
Sylvanus A. Becker.....	<i>Civil Engineering</i>
Loyal Vivien Bewley.....	<i>Electrical Engineering</i>
Charles Clarence Bidwell.....	<i>Physics</i>
Robert Dominick Billinger.....	<i>Chemistry</i>
Ward Leslie Bishop.....	<i>Finance</i>
Frederick Alden Bradford.....	<i>Finance</i>
Elmer Clark Bratt.....	<i>Accounting</i>
Sydney MacGillvary Brown.....	<i>History</i>
Thomas Edward Butterfield.....	<i>Mechanical Engineering</i>
Allison Butts.....	<i>Metallurgy</i>
Alfred Copeland Callen.....	<i>Mining Engineering</i>
Neil Carothers.....	<i>Economics</i>
Preston Banks Carwile.....	<i>Physics</i>
Wray Hollowell Congdon.....	<i>Education</i>
Roy Burford Cowin.....	<i>Accounting</i>
Earl LeVerne Crum.....	<i>Greek</i>
Herbert Maynard Diamond.....	<i>Economics and Sociology</i>
Alpha Albert Diefenderfer.....	<i>Chemistry</i>
Gilbert Everett Doan.....	<i>Metallurgy</i>
Howard Eckfeldt.....	<i>Mining Engineering</i>
Warren Walter Ewing.....	<i>Chemistry</i>
Adelbert Ford.....	<i>Psychology</i>
Tomlinson Fort.....	<i>Mathematics and Astronomy</i>
Donald McCoy Fraser.....	<i>Geology</i>

Merton Otis Fuller	<i>Civil Engineering</i>
Lawrence Henry Gipson	<i>History and Government</i>
Wilson Leon Godshall	<i>History and Government</i>
James Larmour Graham	<i>Psychology</i>
Dale Hartzler Gramley	<i>Journalism</i>
Robert William Hall	<i>Biology</i>
George Dewey Harmon	<i>History</i>
Thomas Huger Hazlehurst	<i>Chemistry</i>
Nelson Sherk Hibshman	<i>Electrical Engineering</i>
Percy Hughes	<i>Philosophy</i>
Cyril Dewey Jensen	<i>Civil Engineering</i>
Arthur Warner Klein	<i>Mechanical Engineering</i>
Henry Carl Ivar Knutson	<i>Electrical Engineering</i>
Theodore Thomas Lafferty	<i>Philosophy and Education</i>
Kenneth Worcester Lamson	<i>Mathematics</i>
Charles Rozier Larkin	<i>Physics</i>
Fred Viall Larkin	<i>Mechanical and Industrial Engineering</i>
Archie Roscoe Miller	<i>Electrical Engineering</i>
Benjamin LeRoy Miller	<i>Geology</i>
Robert Pattison More	<i>German</i>
Harvey Alexander Neville	<i>Chemistry</i>
Philip Mason Palmer	<i>German</i>
Max Petersen	<i>Physics</i>
George Emil Raynor	<i>Mathematics</i>
Joseph Benson Reynolds	<i>Mathematics</i>
Edgar Heisler Riley	<i>English</i>
Ernst Bernhard Schulz	<i>Government</i>
Jonathan Burke Severs	<i>English</i>
Clarence Albert Shook	<i>Mathematics</i>
Charles Wellington Simmons	<i>Chemical Engineering</i>
Eric Spencer Sinkinson	<i>Mining Engineering</i>
Lloyd LeRoy Smail	<i>Mathematics</i>
Robert Metcalf Smith	<i>English</i>
Bradley Stoughton	<i>Metallurgy</i>
Milton Caleb Stuart	<i>Mechanical Engineering</i>
Hale Sutherland	<i>Civil Engineering</i>
Edwin Raymond Theis	<i>Chemical Engineering</i>
Harold Prescott Thomas	<i>Education</i>
Stanley Judson Thomas	<i>Biology</i>
Lawrence Whitcomb	<i>Geology</i>

Bradford Willard.....	<i>Geology</i>
Horace Wetherill Wright.....	<i>Latin</i>

Executive Committee of the Graduate Faculty

President Williams; Dean Fort, *Chairman*; Professor More, *Executive Secretary*; Professors Diamond, Bidwell, Neville, Doan, and Willard.

THE GRADUATE SCHOOL

Opportunity for graduate study was contemplated at Lehigh from its beginning and was announced in its first Register in 1866. More definite organization of the work along lines that are now generally accepted dates from 1883. Since that time the degrees of Master of Arts and Master of Science have been offered without interruption. The degree of Doctor of Philosophy was also announced for a time and twice conferred. In the middle nineties this degree was withdrawn and doctoral work was not again offered until 1936, when it was once more authorized by the trustees. In this same year the Graduate School was organized, with a graduate faculty which has full power to enact the necessary legislation governing the work of the School. The faculty is composed of the president of the University and all professors and associate professors who give work for graduate credit. The rules and regulations of the faculty are administered by an executive committee composed of the president of the University, the dean of the Graduate School, the executive secretary of the graduate school faculty, and five elected members of the graduate faculty.

At present, Lehigh University offers to qualified students in various branches of literature, science, and technology advanced instruction leading to the degrees of Master of Arts and Master of Science and, in a more limited number of fields, work leading to the degree of Doctor of Philosophy.

Major work leading to the master's degree may be taken in the following fields: bacteriology, biology, chemical engineering, chemistry, civil engineering, education, electrical engineering, English, French, geology, Greek, history and government, industrial engineering, Latin, mathematics, mechanical engineering, metallurgical engineering, mining engineering, philosophy,

physics, psychology, and Spanish. In the fields of accounting, economics, finance, German, and sociology, major work is not offered, but students majoring in other fields may take collateral work in these fields from the list of courses for advanced undergraduates and graduates ("100" courses).

Work leading to the doctorate is offered in the following fields: chemical engineering, chemistry, civil engineering, electrical engineering, geology, history, mathematics, mechanical engineering, metallurgical engineering, and physics.

Prospective students who are interested in graduate work in particular fields are in all cases advised to get in touch with the heads of the departments in question before attempting to register. Such consultation will be to their benefit in that they will get a definite understanding as to the adequacy of their preparation, as well as of the facilities the University has to offer for work in their fields.

Admission to Graduate Standing

A student who has taken the bachelor's degree or a degree in technology at a recognized college, university, or technical institution may be admitted as a graduate student. He must file at the office of the director of admissions a statement, on a form provided for the purpose, of his collegiate experience and of his graduate objectives, and an official transcript of his academic record. If this is satisfactory, he will then be admitted to graduate standing. Filing a transcript is not necessary in the case of work done at Lehigh University.

Admission to graduate standing permits the student to take any course for which he has the necessary qualifications. *It does not imply admission to candidacy for a degree.* Admission to candidacy for an advanced degree is granted in accordance with the provisions set forth below under "Degrees."

Women are admitted as graduate students on the same terms as men. However, women are not admitted either as registered students or as listeners in courses primarily for undergraduates (courses numbered from 1 to 99), and their enrollment in courses open to advanced undergraduates and graduates ("100" courses), is subject to the special approval of the head of the department concerned. These restrictions do not apply during the summer session.

Students of Lehigh University who are within a few hours of meeting the requirements for the bachelor's degree may, if given permission by the graduate faculty, enroll for a limited amount of work for graduate credit.

Registration

The registration days for graduate students each semester are the Thursday, Friday, and Saturday following the undergraduate registration days (see calendar). The last day for graduate registration is the tenth day of instruction.

It should be noted that the graduate work itself starts promptly at the beginning of the semester. It is frequently true that graduate courses can only be given if there is a certain minimum demand for them. Delay in enrolling for the course may therefore result in causing the course to be withdrawn for the semester.

Tuition and fees

The tuition for graduate courses is at the rate of \$10.00 per semester hour.

All new students pay, once only on admission, a matriculation fee of \$5.00. Students at graduation pay a graduation fee of \$10.00.

A library fee of \$2.50 per semester and a health service fee of \$6.00 per semester are paid by all students registered for the first or second semesters, except those registered for fewer than seven hours per semester.

Graduate students in residence who have met all course and residence requirements for the doctoral degree pay a dissertation fee of \$50.00 per semester.

For an unregistered master's thesis prepared in absentia, a reading fee of \$25.00 is charged.

For a doctoral dissertation prepared in absentia a reading fee of \$50.00 is charged.

Graduate students are given the option of paying or not paying the athletic fee of \$15.00 a year and the student activities fee of \$2.50 per semester. If they pay these fees, they obtain the corresponding benefits.

There are also laboratory fees or deposits in laboratory courses to cover the cost of laboratory supplies used by the individual students and to provide for breakage of glassware and instru-

ments. The amounts of these fees and deposits are given in the description of courses in connection with each laboratory course.

Refunds

For university regulations concerning refunds, see page 34.

Members of the University Staff

Full-time members of the university staff may not take more than six semester hours of graduate work in any one semester; half-time members of the staff may not take more than ten semester hours.

Filing of Application for Degree

Candidates for degrees on University Day file on or before May 15 a written notice of candidacy for the degree, which notice shall bear the bursar's receipt for the required graduation fee of \$10.00; candidates for degrees on Founder's Day file a similar notice of candidacy on or before September 25. A blank to be used for this purpose is supplied by the registrar's office and filed with the bursar at the time of payment of the graduation fee. Failure to file such notice by the dates mentioned debars the candidate from receiving the degree at the ensuing graduation exercises. A candidate who pays his graduation fee and then fails to qualify for his degree will, on application, receive a refund of the fee.

DEGREES

Master of Arts and Master of Science

The master's degree is granted to properly qualified students who complete satisfactorily a full year of advanced work. In meeting the requirements for the degree, the student must comply with the following regulations:

1. All work which is to be credited toward a master's degree must be done in actual and regular attendance at Lehigh University.
2. A minimum of thirty semester hours is required for the master's degree.
3. Each candidate for a degree must submit for the approval of the graduate faculty the program of courses he proposes to take to satisfy the requirements for the master's degree. This program must have the approval of the head of the major de-

partment, and also of instructors in such courses, not in the major field, as may be included. Approval of the program by the graduate faculty signifies that the candidate has been formally admitted to candidacy for the degree.

4. At least eighteen of the required thirty semester hours must be taken in one department, which shall be the student's major department or field. The remaining twelve hours, or any part of them, may also be taken in the major department; or they may be taken in any other field in which courses for graduate credit are given, as the needs or interests of the student may indicate. The distribution of the work shall be made upon the advice and with the approval of the head of the major department. In all cases, the work for the master's degree must be taken under at least two instructors.

5. At least twelve of the eighteen semester hours required in the major department and at least fifteen of the thirty semester hours required for the degree must be taken in courses open primarily to graduates ("200" courses). Courses primarily for undergraduates are not accepted for graduate credit.

6. A thesis may be required by the major department. If required, the thesis shall not count for more than six semester hours. The credit to be allowed shall be fixed by the head of the major department. Two bound typewritten copies of the thesis (one of which shall be an original copy), approved by the head of the major department, shall be placed in the hands of the secretary of the graduate faculty at least two weeks before the day on which the degree is to be conferred. Information as to the form in which the thesis must be presented may be obtained from the librarian of the University or from the executive secretary of the graduate faculty.

7. The master's degree is not granted unless the candidate has earned the grades A or B in at least eighteen hours of the work on his program. No course in which the grade earned is less than C is credited toward the degree.

When all requirements have been met, the candidate is recommended by the faculty to the trustees for the master's degree appropriate to the work pursued.

Doctor of Philosophy

The degree of Doctor of Philosophy is conferred on candidates who have demonstrated general proficiency and high

attainment in a special field of knowledge and capacity to carry on independent investigation in that field as evidenced by the presentation of an acceptable dissertation embodying the results of original research. The requirements for the degree are more specifically set forth in the following regulations.

1. TIME REQUIREMENTS. A candidate is ordinarily expected to devote three or more academic years to resident graduate study. In no case is the degree awarded to one who has spent less than two full academic years in resident graduate work. Study for any specified period of time, however, is not in itself regarded as sufficient ground for the award of the degree.

Graduate work done in residence at other institutions will be accepted in partial fulfillment of the time requirements, provided such work is approved by the graduate faculty and by the departments concerned.

Work of fragmentary character scattered over a long period of years, or work completed many years before the student becomes a candidate for the degree at Lehigh will be reviewed by the graduate faculty and may be credited in part or in whole towards the fulfillment of the time requirements.

2. RESIDENCE REQUIREMENTS. A candidate for the degree must complete at least one full academic year of resident graduate study at Lehigh University.

3. ADMISSION TO CANDIDACY. Candidates for the doctorate are accepted in a limited number of departments only, and a department may limit the number of candidates accepted in any year. In exceptional cases new students may be admitted to candidacy immediately upon registration in the Graduate School. Ordinarily, however, they are required to spend at least one semester in residence before they are accepted as candidates. Admission to candidacy is granted by the graduate faculty, following written application by the student, upon the recommendation of the departments concerned. In passing upon a student's application, his general education, as well as his special qualifications for work in his chosen field, is taken into consideration. Each applicant is notified by the executive secretary of the graduate faculty, in writing, of the action of the faculty upon his application.

The application of a foreign student must be accompanied by a statement from the department in which he intends to specialize, certifying that he has a satisfactory command of English.

At the time of admission to candidacy a special committee is appointed by the executive committee of the graduate faculty to direct the work of the candidate.

4. PLAN OF WORK. The preparation for the degree is based on the study of a major subject, to which one or two minors may be added. The program of work to be formulated by the candidate, his special committee, and the head of his major department, should be planned to lead to general mastery of the major field and to a significant grasp of any minor that may be added. The program must be approved by the executive committee of the graduate faculty.

While there is no definite requirement as to the number of courses to be taken, two years devoted to formal courses is the customary minimum. In no instance, however, is the degree awarded merely for the faithful completion of any program of courses.

5. LANGUAGE REQUIREMENTS. The candidate must give evidence, through examination, of a reading knowledge, sufficient for the purposes of his special studies, of at least two foreign languages (in addition to any language which may constitute his major subject). In each case the required languages are designated by the candidate's major department and approved by the graduate faculty. The language requirements must be satisfied before the student presents himself for the general examination, described below.

Language examinations are in charge of a committee consisting of representatives of the language department concerned and of the candidate's major department.

Permission to take the language examinations does not imply admission to candidacy for the degree.

6. GENERAL EXAMINATION. The general examination for the doctorate is designed to test both the student's capacity and his proficiency in his field of study. The examination is not necessarily confined to the content of courses that have been taken at Lehigh University or elsewhere. It is ordinarily held not earlier

than toward the close of the second year of work, nor later than seven months prior to the time when the candidate plans to receive the degree. The student's special committee is in charge of the examination, which is both written and oral.

Application for admission to the general examination must be filed with the executive secretary of the graduate faculty at least one month before the time of the examination. No student is permitted to take this examination who has not been admitted to candidacy for the doctorate or who has not satisfied the language requirements.

Should a candidate fail in the general examination, he may be permitted by the graduate faculty to present himself for a second examination not earlier than five months after the first. If the results of the second trial are also unsatisfactory, no further examination is set.

7. DISSERTATION. The candidate is required to present a dissertation prepared under the general direction of a professor at Lehigh University. The dissertation shall treat a topic related to the candidate's major subject, embody the results of original research, give evidence of high scholarship, and constitute a contribution to knowledge. It must be approved by the professor under whose direction it was written, by the candidate's special committee, and by the graduate faculty. A copy bearing the written approval of the professor in charge must be presented to the executive secretary of the graduate faculty for transmission to the student's special committee not later than May 1, if the degree is to be conferred in June, or not later than September 1, if the degree is to be conferred in October.

The candidate shall deposit with the executive secretary of the graduate faculty, at least one week before the degree is to be conferred, (1) two typewritten copies (one an original copy) of the accepted dissertation, in standard form and binding; (2) an abridgment of the dissertation in a form suitable for publication and acceptable to the candidate's special committee. At the same time he shall deposit with the bursar of the University the sum of fifty dollars (\$50.00). This deposit will be refunded if the dissertation, or an acceptable summary including all its major results, is published within two years after the degree is awarded, in a place and form approved by the executive secretary of the

graduate faculty. Otherwise the deposit will be used by the University to defray the cost of printing and distributing the original abridgment. The period of two years may be extended at the discretion of the graduate faculty.

8. FINAL EXAMINATION. After the dissertation has been accepted by the graduate faculty, the candidate will be orally examined by the officers of professorial rank in the departments concerned and such other persons as may be selected by the candidate's special committee. This examination is ordinarily held not later than June 1 or September 25 of the last year of candidacy.

The candidate shall arrange the time for the examination with the executive secretary of the graduate faculty. Such arrangement must be made not later than May 1 if the degree is to be conferred in June, and not later than June 1 if the degree is to be conferred in October.

Post Doctoral Work

Students who have completed the requirements for the doctorate may enroll for post doctorate individualized study under the guidance of selected members of the faculty. Such a program of study contemplates a broad educational and research development at advanced and mature levels, and provides opportunities to prepare for specific positions. A formal certification of such work as may be accomplished by the student will be made.

Description of Courses

DESCRIPTION OF COURSES

Following is a list of the undergraduate and graduate courses offered by Lehigh University. The number of credit hours of each course is indicated by the figure in parentheses. Three hours of drawing, of work in the laboratory, or of practice in the field are regarded as equivalent to a recitation or lecture of one hour's duration.

Prerequisites

Prerequisites are of two kinds: primary prerequisites which are strictly essential; secondary prerequisites which are highly desirable but not absolutely essential. Secondary prerequisites may be waived by the head of the department concerned. In the following description of courses, primary prerequisites are printed in italics and secondary prerequisites in roman type.

ACCOUNTING

PROFESSOR COWIN

ASSOCIATE PROFESSORS BRATT AND ALLEN, MR. KRIEBEL

DEAN CAROTHERS

ACCOUNTING

Acctg. 1 Accounting (3).

The elementary principles of accounting with problem work to develop a knowledge of accounting method and practice. Financial statements and their preparation, analysis and recording of transactions, journalizing and posting, use of special ledgers and journals, adjusting and closing accounts. First semester.

Acctg. 2 Accounting (3).

Elementary accounting problems peculiar to proprietorships, partnerships, and corporations; manufacturing enterprises; depreciation; and a more detailed consideration of financial statements than is possible in Acctg. 1. Prerequisite: *Acctg. 1*. Second semester.

Acctg. 4. Accounting for Engineers (3).

An intensive course in the principles and practices of accounting, covering the fundamentals in one semester. Especially designed for engineering students. Prerequisite: *junior standing*. First and second semesters.

For Advanced Undergraduates and Graduates

Acctg. 113. Advanced Accounting (3).

Problems of the balance sheet, its form and content, the valuation of assets, liabilities, and problems relating to capital stock, surplus, and reserves. Prerequisite: *Acctg. 2 or 4*. First semester. Mr. Cowin

Acctg. 114 Advanced Accounting (3).

Problems of profit and loss statements, income, receiverships and bankruptcy, estates, and consolidated statements. Prerequisite: *Acctg. 2 or 4*. Second semester. Mr. Cowin

Acctg. 115. Cost Accounting (3).

The principles and methods used to determine unit costs of product or services. Material, labor, and overhead costs, methods of distributing overhead, and the application of cost principles to job order and process production. Prerequisite: *Acct. 2 or 4*. First semester. Mr. Allen

Acctg. 118. Advanced Cost Accounting (3).

Special cost problems such as: standard costs, distribution costs, joint costs. The managerial use of cost data, control of costs, and design of cost accounting systems. Prerequisite: *Acctg. 115*. Second semester. Mr. Allen

Acctg. 120. Auditing (3).

The different types of audits and special investigations. Problems involving audit principles and procedure; methods of detecting and preventing fraud; the writing of audit reports; the ethics and the legal responsibilities of accountants. Prerequisite: *Acctg. 2 or 4*. Second semester. Mr. Allen

Acctg. 171. Readings in Accounting (3).

An unrostered course designed for students in the College of Arts and Science majoring in accounting, and for students in the College of Business Administration having special interest in some phase of accounting not covered by the rostered courses. The study may be in the history of accounting, accounting theory, municipal or public utility accounts, or any special subject approved by the instructor. Prerequisites: *senior standing and Acctg. 2 or 4*. First semester. Mr. Cowin

Acctg. 172. Readings in Accounting (3).

Continuation of Acctg. 171. Prerequisites: *senior standing and Acctg. 2 or 4*. Second semester. Mr. Cowin

ECONOMIC STATISTICS

For Advanced Undergraduates and Graduates

E.S. 145. Statistical Method (3).

The methods of statistical description and induction, including tabular and graphic analysis and presentation. Prerequisite: *Eco. 4*. First semester. Mr. Bratt

E.S. 146. Business Cycles and Forecasting (3).

The nature of the business cycle and the application of statistics to business trends, with special attention to forecasting and business barometers. Prerequisite: *E. S. 145*. Second semester. Mr. Bratt

BIOLOGY

E.S. 147. Statistical Analysis (3).

Analysis of the problem of measuring economic categories such as industrial growth, national income, price variation, and demand. The significance of data; method. Prerequisite: *E. S. 146*. First semester.

Mr. Bratt

E.S. 148. Advanced Business Cycles (3).

Recent business cycle theories; the evolution of the theories, and the problems of economic change which the theories attempt to explain. Prerequisite: *E. S. 146*. Second semester.

Mr. Bratt

LAW

Law 2. Business Law (3).

A course designed primarily for students of accounting. The law of partnerships, corporations, property, personal relations, insurance, transportation, bailments, patents, copyrights, and trademarks. Prerequisite: *Eco. 4*. Second semester.

For Advanced Undergraduates and Graduates

Law 102. Business Law (3).

The law of contracts, sales, negotiable instruments, and bankruptcy. Prerequisite: *Eco. 4*. Second semester.

Mr. Carothers

Law 103. Federal Tax Law (3).

The most recent revenue acts; procedure in using the law and regulations to determine the amount of the tax liability. Income tax, estate tax, gift tax, capital stock tax, excess profits tax, and other related federal taxes. Prerequisite: *Acctg. 2 or 4*. First semester.

Mr. Cowin

ASTRONOMY

See Mathematics and Astronomy

ATHLETICS

See Division of Intercollegiate Athletics

BIOLOGY

PROFESSORS S. J. THOMAS AND HALL
ASSISTANT PROFESSOR TREMBLEY
MESSRS. SELL AND PARKER

Biol. 1. Biology (3).

General distribution requirement for arts students who do not intend to major in biology. Topics studied are: protoplasm, metabolism of lower forms of life, anatomy and physiology of multicellular animals. Origin of life, genetics, and eugenics. Evolution. Two recitations and one laboratory period per week. Fee, \$3.00. First semester.

Biol. 2. Mammalian Anatomy (2).

Detailed dissection of a mammal. Two laboratory periods a week. Prerequisite: Biol. 10 or its equivalent. Fee, \$5.00. Second semester.

Biol. 3. Comparative Anatomy of Vertebrates (3).

The dissection of types of the several vertebrate classes in the laboratory. Recitations on functional and anatomical differences. Prerequisite: Biol. 10 or its equivalent. Fee, \$3.00. Second semester.

Biol. 6. Botany (3).

Fundamentals of the morphology and physiology of plants. The evolutionary development of the plant kingdom. Two lectures and one laboratory period per week. Field trips in the Spring. Fee, \$3.00. Second semester.

Biol. 7. Elementary Biology (3).

A survey course in biological principles leading to an understanding of man's place in his living and non-living environment.

Biol. 8. Elementary Biology (3).

Continuation of Biol. 7. The theories of genetics, eugenics, and human evolution. Prerequisite: Biol. 1 or 7. Second semester.

Biol. 10. Zoology (3).

A foundation course for majors in biology. Living things are studied from a functional rather than purely morphological viewpoint. Proto-plasm, cellular metabolism, reproduction, and other fundamental conceptions of life-processes. Recitations, lectures, and laboratory. Fee, \$3.00. First semester.

Biol. 11. Animal Ecology (3).

A recitation, lecture, laboratory and field course in the fundamentals of animal taxonomy and conservation. Basic interrelationships between animals and their physical and biological environments, animal successions, type habitats, and economic ecology. Laboratory work in the morphology of the invertebrate phyla and the classes of vertebrates. Observations of animals in their local habitats. Prerequisite: Biol. 1 or its equivalent. Fee, \$3.00. Second semester.

Biol. 13. Human Biology (3).

Fundamental principles of biology using man as a type. Man's place in nature. The biology of the individual. Protoplasm. The body as a whole. Man's organ systems. Group biology. Man in relation to his environment. Genetics and human inheritance. The future of man. Human evolution. First and second semesters.

Biol. 14. Genetics and Eugenics (1).

Designed for students who are not majoring in biology. The laws of heredity, modern conception of the gene, natural and artificial mutations, the mechanism of evolution, evolutionary trends of the human race, and methods of eugenic betterment. Second semester.

Biol. 15. Freshman Hygiene.

Four lectures on social hygiene, with the cooperation of the director of the student's health service. Given during freshman week. Required of all freshmen. Either this course or Biol. 16 must be passed before graduation.

Biol. 16. Social Hygiene.

For students who have not passed Biol. 15. Second semester.

Biol. 18. Genetics (2).

A study of the basic laws governing inheritance in plants and animals, chromosome behaviour, nature of genes. The relation of environmental modifications, hybrid variations and mutations to the mechanics of evolution. Prerequisite: Biol. 10 or its equivalent. Second semester.

Biol. 20. Physiology (3).

Recitations and demonstrations covering the principles underlying the operation of life-processes. The subject matter is not limited to any one group of organisms, but is derived from living things in general. Prerequisites: Biol. 3, 10; Chem. 150; *Phys.* 12, 16, and 17. Second semester.

Biol. 21. Hygiene (3).

A recitation course in the physiology and anatomy of the human body. The evolution and development of organs and systems. Their structures, functions, and interrelationships as a scientific basis for appropriate attitudes and habits concerning health. Second semester.

Biol. 36. Economic Botany (3).

Economic products of plant origin from the point of view of their development, structural characteristics, uses, and sources. Two recitations and one laboratory period per week. Fee, \$3.00. First semester.

Biol. 50. Sanitary Bacteriology (3).

Study of bacteria and allied microorganisms by staining and cultural methods; their sanitary importance in public water supplies; the bacteriology of sewage and sewage treatment; qualitative and quantitative bacteriological and biological analysis of water, milk, and sewage. Lectures, recitations, and laboratory work. Fee, \$3.00. Second semester.

Biol. 52. Bacteriology (3).

Elementary general bacteriology. The morphological and cultural characteristics of bacteria and allied microorganisms; special attention to forms of sanitary and economic importance; the role of bacteria, yeasts, and molds in fermentation industries, in water and milk, and in disease. Lectures, recitations, and laboratory work. Fee, \$3.00. First semester.

Biol. 54. Bacteriology (3).

An elementary course for students specializing in biological sciences. Special staining methods in the study of morphology; differential media in bacterial physiology; thorough study of the microorganisms themselves

rather than their specific sanitary or industrial importance. Recitations, lectures, and laboratory work. Fee, \$3.00. First semester.

Biol. 55. Biology of Bacteria (3).

A recitation and laboratory course in the study of life processes, using bacteria for demonstration. Cell structure, growth and reproduction, heredity and variation, metabolism, adaption and parasitism, etc., as examples of the relationships of all living things. Fee, \$3.00. Second semester.

For Advanced Undergraduates and Graduates

Biol. 104. Vertebrate Embryology (3).

A lecture, recitation, and laboratory course on the development of vertebrates. Laboratory work on the embryology of an amphibian and the chick, demonstrating the successive stages of cleavage, gastrulation, germ layer formation, and development of tissues and organs. Prerequisites: *Biol. 10 or its equivalent*; Biol. 3. First semester. Mr. Hall

***Biol. 106. Natural History and Ecology (3).**

Identification and life habits of local plants and animals. Laboratory training in the use of analytical keys and of collections of reference, and the correct methods of making collections. Trips to local regions of natural interest for field identification and study of interrelationships of living organisms. Conservation, conservation programs, and appreciation of nature. Three lectures, one laboratory, and one field trip a week. Fee, \$2.00. Summer session. Mr. Trembley

Biol. 113. Histology (3).

The technique of fixing, cutting, and differential staining of animal tissue; the recognition of normal mammalian tissues. Prerequisites: Biol. 10 and 3 or their equivalent. Fee, \$3.00. Second semester. Mr. Trembley

Biol. 153. Advanced Bacteriology (3).

A laboratory and recitation course in medical bacteriology; cultural study of the more common pathogenic bacteria. Prerequisite: Biol. 50, 52, or 54. Fee, \$3.00. Second semester. Mr. Thomas

Biol. 155. Industrial Bacteriology (3).

An advanced laboratory course in bacteriology including aspects of industrial chemistry in which bacteria play an essential part in the process, as in the manufacture of acetone, butanol, acetic and lactic acids. Prerequisites: at least two years of chemistry, including quantitative analysis, Biol. 52 or 54. Fee, \$3.00. Second semester. Mr. Thomas

Biol. 158. Immunology (3).

A comprehensive recitation course in the history of the study of immunity and modern theories concerning its mechanism. Prerequisite: Biol. 153. First semester. Mr. Thomas

* This course is not available as part of a graduate major in biology.

Biol. 161. Public Sanitation (3).

A laboratory study of the biological, chemical, bacteriological, and physical aspects of public water supplies, systems of sewage disposal, and milk distribution. Prerequisite: at least two years of chemistry, including quantitative analysis, Biol. 50, 52, or 54. Fee, \$3.00. First semester.

Mr. Thomas

For Graduates

Prerequisite for graduate work in biology: the amount of biology usually obtained by an undergraduate majoring in that department. Prerequisite for graduate work in bacteriology: a satisfactory course in undergraduate bacteriology and a sufficient preparation in organic chemistry. Ability to undertake graduate work in bacteriology must be demonstrated by previous scholastic record, an examination, or both.

Biol. 203. Vertebrate Histogenesis and Organogenesis (3).

Careful following, in the laboratory, of the development of a vertebrate; tracing of the history of the germ-layers, organs, and tissues. The association of tissues to form organs. First semester.

Mr. Trembley

Biol. 205. History of Biology (2).

A course based on reading, seminars, and written reports. First or second semester.

Mr. Trembley

Biol. 206. Biological Theories (2).

A course dealing especially with genetics. First or second semester.

Mr. Trembley

Biol. 207. Biological Research (3).

Investigations in any phase of the biological sciences according to preparation and interests. First semester.

Messrs. Thomas, Trembley

Biol. 208. Biological Research (3).

Continuation of Biol. 207. Second semester. Messrs. Thomas, Trembley

Biol. 209. Advanced Morphology (3).

A laboratory course in special phases of morphology, such as comparative osteology, comparative morphology, or embryology of the invertebrates, etc. to meet the individual interest of the student. First or second semester.

Mr. Hall

Biol. 260. Serology (3).

A laboratory course in the preparation of antigens, immunization of animals, and the study of antigen-antibody reactions. To be taken concurrently with or following Biol. 158. Prerequisite: Biol. 153. First or second semester.

Mr. Thomas

Biol. 262. Microbiology (3).

The higher bacteria, yeasts, molds, algae, and protozoa of interest to the bacteriologist. Practical applications to sanitary bacteriology, water

supplies, sewage disposal systems, food spoilage and, to a limited extent, human and animal pathology. First or second semester. Mr. Thomas

Biol. 263. Physiology of Bacteria (3).

The biochemistry of bacterial metabolism, zymology, respiration, nutrition, reproduction. First or second semester. Mr. Thomas

Biol. 264. Epidemiology (3).

A seminar dealing with historic epidemics of typhoids, cholera, plague, diphtheria, and the venereal diseases; the methods of transmission of the organisms concerned with mass infections; modern immunological and sanitary practice in prevention. First or second semester. Mr. Thomas

Biol. 265. Industrial Biology (3).

A laboratory course in the preparation and standardization of biological products used in active immunization, diagnosis, and serum therapy. Prerequisite: Biol. 158 and 260. First or second semester. Mr. Thomas

Biol. 266. Public Health Administration (3).

The organization of national, state, and local health services. The relationship between official and volunteer health agencies. The functions of medical health officer, epidemiologist, public health nurse, and sanitary inspectors in a public health program. The various phases of health work, such as eugenics, personal, social and industrial hygiene, sanitation, vital statistics, and public education. First or second semester.

Mr. Thomas

Biol. 267. History of Bacteriology (3).

Reading, conferences, and written reports. First or second semester.

Mr. Thomas

BUSINESS ADMINISTRATION

See Accounting, Economics and Sociology, and Finance

CHEMISTRY AND CHEMICAL ENGINEERING

PROFESSORS NEVILLE, DIEFENDERFER, W. W. EWING,
THEIS AND SIMMONS

ASSOCIATE PROFESSORS ANDERSON, BILLINGER, AND HAZELHURST

ASSISTANT PROFESSORS BECK, SMULL, H. A. SMITH, SCHULTZ
AND SERFASS

MESSRS. MERTZ, AMSTUTZ, FORNOFF, LEVENSON, HEINS,
REICHARDT, STEELE, HAWLEY, STRUB, AND McGRATH

Chem. 1. Elementary Chemistry (2).

Elementary phenomena and principles of chemistry. Lectures illustrated by experiments, diagrams, working drawings, and museum specimens. Given in conjunction with Chem. 11. First and second semesters.

Chem. 2. Elementary Chemistry (2).

Recitations and demonstrations. Primarily for students in the curriculum of arts and science and in the curriculum of business administration. Given in conjunction with Chem. 12. First and second semesters.

Chem. 3. Intermediate Chemistry (2).

A course for students who pass the examination in elementary chemistry held during freshman week. Prerequisite; satisfactory preparation in the rudiments of chemistry. First semester.

Chem. 6. Inorganic Chemistry (3).

Family relationships among the elements. Systematic survey of inorganic chemical compounds, their occurrence, properties, and reactions. Prerequisites: *Chem. 1 and 11, or 3 and 13; Chem. 20; Chem. 8.* First semester.

Chem. 7. Physical Chemistry (3).

Introduction to physical chemistry; states of matter, change of state, solutions, surface phenomena; nuclear, atomic, and molecular structure. Prerequisite: Chem. 6. Second semester.

Chem. 8. Stoichiometry (1).

Chemical problems and reactions. Prerequisites: Chem. 1 and 11, or 2 and 12, or 3 and 13. Second semester.

Chem. 9. Elements of Physical Chemistry (3).

Kinetic theory, change of state, solutions, equilibria, electrochemistry, colloidal phenomena. Especially designed for biology majors. Prerequisites: *Chem. 1 and 11 or 3 and 13; Chem. 20; Chem. 8.* First semester.

Chem. 11. Chemistry Laboratory (2).

Experiments covering a systematic study of the chemical and physical properties of the more important elements and their compounds. Given in conjunction with Chem. 1. Deposit, \$15.00. First and second semesters.

Chem. 12. Chemistry Laboratory (1).

An abridgment of Chem. 11. Given in conjunction with Chem. 2. Deposit, \$15.00. First semester.

Chem. 13. Chemistry Laboratory (2).

Experiments designed to accompany Chem. 3. Prerequisite: satisfactory preparations in the rudiments of laboratory chemistry. Deposit, \$15.00. First semester.

Chem. 14. Chemistry Laboratory (1).

Primarily for arts and science and business administration students. An abridgment of Chem. 13. Deposit, \$15.00. First semester.

Chem. 20. Elementary Chemistry and Qualitative Analysis (3).

Chemistry of the metals and their industrially interesting compounds. The fundamental scientific principles of precipitation, and the practice of qualitative analysis by semi-micro methods. Prerequisites: Chem. 1 and 11, or 2 and 12, or 3 and 13. Deposit, \$25.00. Second semester.

Chem. 30. Quantitative Analysis (3).

Practical work in the quantitative laboratory, accompanied by lectures and recitations; an introduction to gravimetric analysis method and typical fundamental volumetric processes. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20*; Chem. 8. Deposit, \$30.00. First semester.

Chem. 31. Quantitative Analysis (3).

Continuation of Chem. 30. Analysis of metallic products, ores, and alloys of industrial interest chosen to represent the application of quantitative chemical principles to analysis. Prerequisites: *Chem. 1 and 11, or 3 and 13, 20*; Chem. 30. Deposit, \$30.00. Second semester.

Chem. 36. Quantitative Analysis (2).

An abridgment of Chem. 30 for mining and metallurgical engineers. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20*; Chem. 8. Deposit, \$25.00. First semester.

Chem. 37. Quantitative Analysis (2).

Continuation of Chem. 36. Prerequisites: *Chem. 1 and 11, or 3 and 13, 20*; Chem. 8. Deposit, \$30.00. Second semester.

Chem. 39. Assaying, Coal, Gas, and Oil Analysis (4).

The furnace assay of ores of lead, gold, and silver, and of gold and silver bullion; cyanidization; calculations for slags and slag mixtures; the analysis of boiler water, mine water, coal, coke, tar, gas, petroleum and petroleum products; calorimetry. Prerequisites: *Chem. 8 and 30, or 36*. Deposit, \$30.00. Summer session: a lecture and seven hours of laboratory work each week-day for four weeks.

Chem. 41. Quantitative Analysis Conference (1).

Lectures and recitations concerning the scientific foundations and laboratory practice of Chem. 30. Prerequisites: *Chem. 1 and 11, or 3 and 13, 20*. First and second semesters.

Chem. 45. Quantitative Analysis Conference (1).

Continuation of Chem. 41. Lectures and recitations to accompany Chem. 31. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20*; Chem. 41. Second semester.

Chem. 48. Quantitative Analysis Conference (1).

Lectures and recitations to accompany Chem. 36. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20*. First semester.

Chem. 49. Quantitative Analysis Conference (1).

Lectures and recitations to accompany Chem. 37. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20*; Chem. 48. Second semester.

Chem. 50. Summer Work.

During the summer following the junior year students in the curriculum in chemistry are required to gather industrial experience by at least eight weeks' work in industrial shops or laboratories.

Chem. 97. Research Chemistry Laboratory (3).

A variant of Chem. 99 requiring 3 credit hours. Deposit, \$15.00. Second semester.

Chem. 99. Research Chemistry Laboratory (2).

Advanced study or an investigation involving intensive laboratory and library study. Deposit, \$15.00. Second semester.

Among advanced topics in active research are:

Absorption, Analytical Processes	Natural and Synthetic Resins
Drying Oils	Pigments
Engineering Processes	Aldol Syntheses
Heterocyclic Organic Compounds	Plastics
Hydration of Inorganic Salts	Surface Chemistry
Kinetics of Combustion	Tanning and Leather Technology
Photomicrography	X-ray Technique

For Advanced Undergraduates and Graduates

Chem. 110. Modern Aspects of Chemistry for Secondary Schools (3).

Review of the latest developments in chemistry; atomic structure, solutions, electrolytes, acids. Discussion of the proper presentation of such topics at the secondary school level. Correlation of such material with the current offerings in secondary schools. Open primarily to teachers of chemistry or general science in secondary schools. Summer session.

Mr. Hazlehurst

Chem. 134. Radiation Methods (2).

The application of radiation methods, mainly X-ray methods, to chemical and industrial chemical problems. Prerequisite: senior standing. First semester.

Mr. Anderson

Chem. 135. Radiation Methods (2).

Continuation of Chem. 134. Amplification of X-ray diffraction methods. Space groups. Crystal chemistry. Prerequisite: senior standing. Second semester.

Mr. Anderson

Chem. 137. Advanced Analytical Chemistry (3).

One conference and two laboratory periods per week. Prerequisite: 8 hours of quantitative analysis. Deposit, \$30.00. Second semester.

Messrs. Serfass, Mertz

Chem. 144. Radiation Methods Laboratory (1).

Laboratory in connection with Chem. 134. Prerequisite: senior standing. Deposit, \$10.00. First semester.

Mr. Anderson

Chem. 145. Radiation Methods Laboratory (1).

Continuation of Chem. 144. Prerequisite: senior standing. Deposit, \$10.00. Second semester. Mr. Anderson

Chem. 150. Organic Chemistry (3).

Systematic survey of the typical compounds of carbon; their classification and general relations; study of synthetic reactions. Prerequisites: *Chem. 20, 30*. First semester. Messrs. Smull, Schultz

Chem. 151. Organic Chemistry (3).

Continuation of Chem. 150. Prerequisites: *Chem. 20, 30; Chem. 150*. Second semester. Messrs. Smull, Schultz

Chem. 155. Qualitative Organic Chemistry (1).

Systematic laboratory study of classification reactions of pure organic substances and mixtures. Applications to the identification of some industrial products. Prerequisites: *Chem. 150, 151, 165, and 166 or 167*. Deposit, \$10.00. First semester. Mr. Smull

Chem. 158. Advanced Organic Chemistry (3).

Advanced topics in organic chemistry. Continuation of Chem. 151. Prerequisites: *Chem. 150, 151, 165, and 166 or 167*. First semester. Mr. Schultz

Chem. 159. Advanced Organic Chemistry (3).

Chemistry of unsaturated compounds; addition reactions, condensations, polymerizations. Effects of inhibitors and catalysts. Prerequisites: Chem. 151 and 166 or 167. Second semester. Mr. Smull

Chem. 165. Organic Chemistry Laboratory (2).

Preparation of pure organic compounds. Prerequisites: *Chem. 20; Chem. 30*. Deposit, \$30.00. First semester. Messrs. Smull, Schultz, Amstutz

Chem. 166. Organic Chemistry Laboratory (3).

Continuation of Chem. 165. Practical methods of saturation, nitration, reduction, diazotization, sulphonation, etc.; preparation of pure compounds; study of the properties of dyes and other commercial products. Prerequisites: *Chem. 20; Chem. 30 and 165*. Deposit, \$40.00. Second semester. Messrs. Smull, Schultz, Amstutz

Chem. 167. Organic Chemistry Laboratory (2).

Similar to Chem. 166, but shorter. Prerequisites: *Chem. 20; Chem. 30 and 165*. Deposit, \$40.00. Second semester. Messrs. Smull, Schultz, Amstutz

Chem. 168. Advanced Organic Laboratory (2).

The synthesis, characterization, structure determination, and ultimate analysis of organic compounds. Prerequisites: Chem. 165 and 166 or 167. Deposit, \$30.00. First semester. Messrs. Smull, Schultz

Chem. 169, 171, 172. See under Chemical Engineering.

Chem. 179. History of Chemistry (1).

Chronological development of the science with assigned reading. Prerequisites: *Chem. 7 and 151*. Second semester. Mr. Billinger

Chem. 190. Physical Chemistry (3).

Continuation of Chem. 7. The laws of thermochemistry, solutions, rates of reaction and chemical equilibrium in homogeneous and heterogeneous systems based on thermodynamic and kinetic concepts. Prerequisites: *Math. 13, Phys. 23 and 24 or 16, 17; Math 14, Chem. 7*. First semester. Messrs. Ewing, Smith

Chem. 193. Physical Chemistry Laboratory (2).

Physical chemical measurements. Prerequisites: *Math. 13, Chem. 30 or 36; Phys. 23, 24, or 16, 17; Math. 14, Chem. 7*. Deposit, \$10.00. First semester. Messrs. Ewing, Smith

Chem. 194. Physical Chemistry and Electrochemistry (3).

Continuation of Chem. 190. The laws of conductivity, current, electromotive force and energy relations of electrolytes in solutions and in the molten state. Prerequisites: *Math. 13, Phys. 23 and 24 or 16, 17; Math. 14, Chem. 190*. Second semester. Mr. Ewing

Chem. 197. Electrochemistry Laboratory (1).

Experimental study of electrochemical reactions. Measurements of conductivity, current and electromotive force. Prerequisites: *Math. 13, Chem. 30 or 36, Phys. 23 and 24 or 16, 17; Math. 14, Chem. 190*. Deposit, \$5.00. Second semester. Messrs. Ewing, Smith

For Graduates

The prerequisites for graduate work in chemistry as a major study toward the doctorate or the master's degree are: inorganic chemistry and qualitative analysis (8), quantitative analysis (8), organic chemistry (10), physical chemistry (5), physics (12), and mathematics, including calculus (12). Students of exceptional ability may be able to make up minor deficiencies while carrying graduate work. If the deficiencies are serious, a student can hardly expect to complete the requirements for the master's degree within the minimum time.

Graduate students may choose either chemistry or chemical engineering as the major subject. If chemical engineering is the major subject, a number of courses in chemistry, adapted to the needs of the student, will be taken as collateral work. Other subjects may be chosen in related fields, usually physics and mathematics. Men majoring in chemistry will take collateral work in

science, with such engineering topics as may be suited to their objectives. Suggested graduate collateral sequences which carry forward from selected undergraduate electives, see page 84, are:

Business Administration

Acctg. 115. Cost Accounting	Acctg. 118. Adv. Cost. Acct.
Eco. 107. Adv. Economics	Eco. 108. Adv. Economics

Mathematics—Physics

Phys. 160. Intro to Modern Phys. Theories	Phys. 161. Intro. to Modern Phys. Theories
or Math. 111. Diff. Equations	or Math. 112. Diff. Equations
or Phys. 124. Elec. Discharge through Gases	or Phys. 170. Spectroscopy

Biochemistry

Biol. 155. Industrial Bacteriology	Biol. 161. Public Sanitation
C.E. 128. Sanitary Eng.	C.E. 131. Adv. Sanitary Eng.

Education

Educ. 151. Organ. of Materials of Instruction	Educ. 150. Principles of Second- ary Education
Educ. 219. Social Policy and Edu- cation	Educ. 130. History of Ed. in Europe

Chem. 200. Inorganic Chemistry Research (4).

Investigation in the field of organic and colloid chemistry. Deposit, \$30.00. First semester. Messrs. Neville, Hazlehurst, Fornoff

Chem. 201. Inorganic Chemistry Research (4).

Continuation of Chem. 200. Deposit, \$30.00. Second semester. Messrs. Neville, Hazlehurst, Fornoff

Chem. 202. Advanced Inorganic Chemistry (2).

The periodic system and atomic structure, theories of valence with particular attention to the Werner theory of complex compounds, inorganic free radicals, reactions in non-aqueous media, and study of the properties and reactions of certain elements with emphasis on recent developments. First semester. Mr. Fornoff

Chem. 203. Advanced Inorganic Chemistry (2).

Continuation of Chem. 202. Second semester. Mr. Fornoff

Chem. 230. Quantitative Analysis Research (4).

Investigation of problems in analytic procedures. Deposit, \$30.00. First semester. Messrs. Diefenderfer, Serfass, Mertz

Chem. 231. Quantitative Analysis Research (4).

Continuation of Chem. 230. Deposit, \$30.00. Second semester. Messrs. Diefenderfer, Serfass, Mertz

Chem. 236. X-ray Research (3).

The investigation of chemical and industrial problems by X-ray diffraction methods. Deposit, \$30.00. First semester. Mr. Anderson

Chem. 237. X-ray Research (3).

Continuation of Chem. 236. Deposit, \$30.00. Second semester. Mr. Anderson

Chem. 252. Organic Chemistry: Heterocyclic Compounds (3).

The chemistry of thiophene, pyrrole, furan, pyridine and their derivatives considered from the viewpoint of recent organic theories of structure and reaction mechanisms. First semester. Mr. Amstutz

Chem. 258. Topics in Organic Chemistry (3).

Mechanisms, thermodynamics and kinetics of hydrogenation, de-hydrogenation, oxidation; Keto-enol isomerism; molecular rearrangement; catalysts. Some applications to practice. Prerequisite: Chem. 158. Second semester. Mr. Schultz

Chem. 260. Organic Chemistry Research (4).

Investigation of a problem in organic chemistry. Deposit, \$30.00. First semester. Messrs. Smull, Schultz, Amstutz

Chem. 261. Organic Chemistry Research (4).

Continuation of Chem. 260. Deposit, \$30.00. Second semester. Messrs. Smull, Schultz, Amstutz

Chem. 266. Advanced Organic Preparations (2).

Mainly a laboratory course. Deposit, \$30.00. Second semester. Messrs. Smull, Schultz, Amstutz

Chem. 271. The Chemistry of the Proteins (3).

A study of the proteins, amino acid and nucleic acids, their properties, composition, degradation products, oxidation and chemical reactions, synthesis, and analysis. Second semester. Mr. Theis

Chem. 272. The Chemistry of the Carbohydrates (3).

A study of the simple and complex sugars, starches, and cellulose, their synthesis, analysis, reactions, biological relations, occurrence, and industrial applications. First semester. Mr. Theis

Chem. 290. Physical Chemistry Research (4).

Investigation of a problem in physical chemistry; vapor pressure and calorimetric studies in the constitution of inorganic salts. Prerequisites: the equivalent of Chem. 190, 193, 194. Deposit, \$30.00. First semester. Messrs. Ewing, Smith

Chem. 291. Physical Chemistry Research (4).

Continuation of Chem. 290. Deposit, \$30.00. Second semester. Messrs. Ewing, Smith

Chem. 292. Theoretical Chemistry: Kinetics (3).

Kinetic theory of gases and its application to unimolecular and bi-molecular reactions. Chain reactions. Explosions. Reactions in solutions. Heterogeneous reactions. Theory of absolute reaction rates. Prerequisites: A good working knowledge of mathematics. Chem. 294. Second semester. Mr. Smith

Chem. 293. Theoretical Chemistry: Kinetics (3).

Continuation of Chem. 292. Kinetics of explosions of solids. Combustion and explosion of hydrogen and hydrocarbons. Polymerization. Kinetics of organic reactions. First semester. Mr. Smith

Chem. 294. Theoretical Chemistry: Thermodynamics (3).

Thermodynamics theory of chemical equilibria; activity method of treating solutions; systematic free energy calculations. Prerequisites: a good working knowledge of mathematics and the equivalent of Chem. 190, 193, and 194. First semester. Mr. Hazlehurst

Chem. 295. Theoretical Chemistry: Thermodynamics (3).

Continuation of Chem. 294. Statistical theory of thermodynamics; heat capacity equations; quantum theory in chemical thermodynamics; reports and discussions on selected topics. Second semester. Mr. Hazlehurst

Chem. 296. Surface Chemistry (3).

Colloidal systems; surface phenomena. Lectures and reports. First semester. Mr. Neville

Chem. 297. Surface Chemistry (3).

Continuation of Chem. 296. Applications of colloid chemistry; contact catalysts; special topics. Lectures and seminar. Second semester. Mr. Neville

Chem. 298. Advanced Physical Chemistry Seminar (3).

An intensive study of some field of physical chemistry. First and second semesters. Messrs. Ewing, Smith

Chem. 299. Physical Chemistry Methods (2).

Advanced course in methods of physical chemistry laboratory practice. Prerequisite: the equivalent of Chem. 193 and 197. Deposit, \$30.00. First semester. Mr. Ewing

CHEMICAL ENGINEERING

PROFESSORS SIMMONS, THEIS

ASSOCIATE PROFESSORS ANDERSON, BILLINGER

ASSISTANT PROFESSOR SERFASS

MESSRS. MERTZ, McGRATH, STRUB

Ch.E. 78. Chemical Engineering (3).

Principles of chemical engineering related to fluid flow, materials, handling, disintegration and mechanical separation. Assigned reading in texts and current literature on industrial processes. Prerequisites: *Math.* 13; *Math.* 14, *Chem.* 30 and 41. First and second semesters.

Ch.E. 79. Chemical Engineering (3).

A continuation of Chem. 78, including heat generation and exchange. (Two hours lectures and three hours laboratory). Prerequisites: *Math 14*; Chem. 6, 31, 45, and 150; Ch.E. 78. Deposit, \$15.00. Second semester.

Ch.E. 80. Industrial and Engineering Chemistry (3).

Introduction to chemical engineering principles through a study of unit process operations in various chemical industries. Prerequisites: *Chem. 30 and 41*; *Math. 14*. Second semester.

For Advanced Undergraduates and Graduates

Chem. 169. Industrial Biochemistry Laboratory (1).

Laboratory work to accompany Chem. 171. Prerequisites: Chem. 150 and 165. Deposit, \$15.00. First semester. Messrs. Theis, Serfass

Chem. 171. Industrial Biochemistry (3).

The inorganic, organic, and physical chemistry of life processes and their products. Atomic and molecular structure, equilibria, colloidal state, catalysis, osmosis, synthesis, oxidation, and reduction as applying to carbohydrates, proteins, fats, lipoids, and their interrelations. This course may be taken without Chem. 169. Prerequisites: Chem. 150, 151, 165, and 166 or 167. First semester. Mr. Theis

Chem. 172. Industrial Biochemistry (3).

Continuation of Chem. 171 with special adaptations to tanning, foods, fermentation industries, sanitation, and sewage disposal. Second semester. Mr. Theis

Ch.E. 180. Chemical Engineering (3).

A continuation of Chem. 79, including phase change separation, design and cost data on unit processes and manufacturing plants. Visits to industrial plants in the Philadelphia area for inspection of large units are a part of the course. (Two hours lecture and three hours laboratory). Prerequisites: *Chem. 31, 45, and 150*; *Ch.E. 78*. Chem. 7, 9, and 151; Ch.E. 79. Deposit, \$25.00. First semester. Mr. Simmons

Ch.E. 181. Chemical Engineering (3).

Continuation of Chem. 180. Visits to industrial plants in the New York area are a part of the course. Prerequisites: *Ch.E. 79 and M.E. 29*; Chem. 180, 190, and 193. Second semester. Mr. Simmons

Ch.E. 185. Chemical Engineering Practice (1).

Comprehensive studies in nearby manufacturing plants of a few processes involving one or more unit engineering operations. These studies usually occupy time covering whole days or multiples thereof. Prerequisite: Ch.E. 180. Deposit, \$10.00. Second semester. Mr. Simmons

For Graduates

Ch.E. 280. Industrial Chemistry and Chemical Engineering Research (4).

Investigation of a problem in chemical engineering or in industrial chemistry. Prerequisites: for problems in industrial chemistry, as in the

statement above introductory to graduate courses; for investigation of a problem in chemical engineering, an undergraduate curriculum in chemical engineering substantially equivalent to the curriculum in this University. Deposit, \$30.00. First semester. Messrs. Theis, Simmons

Ch.E. 281. Industrial Chemistry and Chemical Engineering Research (4).

Continuation of Ch.E. 280. Deposit, \$30.00. Second semester. Messrs. Theis, Simmons

Ch.E. 282. Chemical Engineering.

Advanced consideration of chemical engineering energetics, hydrodynamics and heat transfer applied to filtration, classification, and extraction. Prerequisites: courses substantially equivalent to the undergraduate curriculum in this University. Given in alternate years. First semester. Mr. Simmons

Ch.E. 283. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282, as applied to evaporation, refrigeration, and crystallization. Given in alternate years. Second semester. Mr. Simmons

Ch.E. 284. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282 and 283, as applied to absorption and distillation. Given in alternate years. First semester. Mr. Simmons

Ch.E. 285. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282 and 283, as applied to combustion, drying, hygrometry, and air conditioning. Given in alternate years. Second semester. Mr. Simmons

Ch.E. 288. Chemical Engineering Process Design (3).

The applications of chemical engineering principles in the design of unit process equipment involving such processes as evaporation, distillation, drying, filtration, and absorption and the coordination of such units into organized production. Prerequisites: courses substantially equivalent to the undergraduate curriculum in chemical engineering in this University. Deposit, \$30.00. First semester. Messrs. Theis, Simmons

Ch.E. 289. Chemical Engineering Process Design (3).

Continuation of Ch.E. 288. Deposit, \$30.00. Second semester. Messrs. Theis, Simmons

CIVIL ENGINEERING

PROFESSOR SUTHERLAND

ASSOCIATE PROFESSORS S. A. BECKER, FULLER, AND JENSEN

ASSISTANT PROFESSORS PAYROW, UHLER, ENEY, JOHNSTON,

AND IPPEN

MR. GODFREY

C.E. 1. Engineering Drawing (2).

The use of drawing instruments; lettering and tracing; mechanical drawing of objects; simple projections; isometric drawings; principles of projection drawing. First semester.

C.E. 2. Engineering Drawing (2).

Continuation of C.E. 1. Working drawings; applications of projection drawing. Prerequisite: C.E. 1. Second semester.

C.E. 6. Land and Topographic Surveying (4).

The theory and practice of land surveying, including computation of areas, dividing land; map drawing and topographic signs; field work with level and transit; theory and use of stadia. Prerequisites: *plane trigonometry*; C.E. 1. Summer session: a recitation and seven hours of field work each week-day for four weeks

C.E. 8. Mechanics of Materials (4).

The physical properties of structural materials; theory of beams, columns, and shafts. Prerequisites: *Math. 13*; *Math. 14*. First semester.

C.E. 9. Mechanics of Materials (3).

An abridgment of C.E. 8. Prerequisites: *Math. 13*; *Math. 14*. First and second semesters.

C.E. 10. Materials Testing Laboratory (1).

Experiments on wood, iron, and steel to determine the action of materials under stress and to study the physical properties of materials of construction. Prerequisite: *C.E. 8 or 9, previously or concurrently*. Fee, \$5.00. First and second semesters.

C.E. 11. Railroad Engineering (3).

Theory of curves and turnouts; preparation of profiles and maps; the computation of earth work and estimates of cost; the construction and maintenance of road-bed and of drainage structures. Prerequisite: C.E. 6. Second semester.

C.E. 12. Hydraulics (3).

Hydrostatics and theoretical hydraulics; the flow of water through orifices, weirs, tubes, pipes, and channels; hydraulic motors. Prerequisites: *Math. 13*; *Math. 14*. Second semester.

C.E. 13. Hydraulics (2).

An abridgment of C.E. 12. Prerequisites: *Math. 13*; *Math. 14*. Second semester.

C.E. 14. Hydraulics Laboratory (1).

Experiments in the measurement of water and the testing of hydraulic machinery. Prerequisites: *C.E. 12 or 13, or Chem. 78, previously or concurrently*. Fee, \$5.00. Second semester.

C.E. 15. Structural Theory: Stresses (4).

Algebraic and graphic determination of stresses in roof and bridge trusses under dead, live, and wind loads. Prerequisite: C.E. 8 or 9. Second semester.

C.E. 15a. Structural Theory: Stresses (3).

An abridgment of C.E. 15. Prerequisite: C.E. 8 or 9. Second semester.

C.E. 16. Highway Engineering (3).

The location, construction, and maintenance of roads and pavements; highway design. Prerequisite: C.E. 6. First semester.

C.E. 16a. Highway Engineering (2).

An abridgment of C.E. 16. Prerequisite: C.E. 6. First semester.

C.E. 19. Advanced Mechanics of Materials (3).

A continuation of C.E. 8. Stresses at a point, theories of failure, energy loads, dynamic stress effects, unsymmetrical bending, curved beams, torsional resistance of bars with non-circular cross-sections. Prerequisites: *Math. 14*; C.E. 8. Second semester.

C.E. 29. Industrial Employment.

During the summer following the junior year, students are required to spend at least eight weeks in shop work or on engineering construction, and are required to submit a written report.

C.E. 30. Structural Design (3).

Design of mine structures in steel and wood. An elective course for mining engineers. Prerequisite: C.E. 9. Second semester.

C.E. 31. Route Surveying (2).

Reconnaissance, preliminary, office, and field location methods; laying out curves, setting slope stakes; staking out drainage and other structures. One recitation and seven hours of field work each week-day for two weeks. Prerequisites: C.E. 6; C.E. 11. Summer session.

C.E. 32. Mechanics of Materials (3).

A course somewhat more advanced in content than C.E. 9 with the inclusion of a number of tests of materials. Prerequisites: *M.E. 4*; *Math. 13*; *Math. 14*. Fee, \$2.50. First and second semesters.

C.E. 33. Hydraulics (3).

Two recitation periods per week devoted to the more important principles of theoretical hydraulics with practical applications, and a laboratory period given to the study of the flow of water through pipes, orifices, and turbines. Prerequisites: *Math. 13*; *Math. 14*. Fee, \$5.00. First semester.

C.E. 35. Advanced Surveying (3).

Adjustment of instruments; investigation of systematic and observational errors; elements of least squares with applications to surveying; adjustment of level nets and triangulation; solar and polar observations. Field work in triangulation, determination of azimuth, precise leveling, and with the plane table. Brief treatment of mine surveying and photogrammetry. Prerequisite: C.E. 6. First semester.

C.E. 40. Engineering Conference.

Required of seniors in the curriculum of civil engineering. Second semester.

C.E. 41. Civil Engineering Proseminar (2).

A study of current civil engineering projects and developments with written reports. At weekly meetings these reports are presented orally in abstract. Prerequisite: senior standing. Second semester.

C.E. 41a. Civil Engineering Proseminar (1).

An abridgment of C.E. 41. Prerequisite: senior standing. Second semester.

C.E. 50. Thesis (3).

Thesis may be taken only by students of outstanding ability. Second semester.

For Advanced Undergraduates and Graduates

C.E. 100. Engineering Valuation and Economy (3).

The determination of probable life, earning power, and present worth of public and private industrial properties. Prerequisites: senior standing in engineering; Fin. 25; Acctg. 4 desirable either previously or concurrently. Second semester. Mr. Eney

C.E. 101. Foundations (2).

Construction and design; elements of soil mechanics with applications to foundations. Prerequisites: C.E. 8 or 9; Geol. 9. Second semester. Mr. Fuller

C.E. 118. Structural Theory (3).

Study of the principles of design of structural members of wood and steel. Concurrent with C.E. 119. Prerequisites: C.E. 8; C.E. 15. First semester. Mr. Eney

C.E. 119. Structural Design (3).

Application of the principles studied in C.E. 118 to the design both of individual structural members and certain complete structures, principally a plate girder bridge, a steel building frame, and a truss bridge. Prerequisite: *concurrent with C.E. 118*. First semester. Mr. Uhler

C.E. 119a. Structural Design (1).

An abbreviation of C.E. 119. Prerequisite: *concurrent with C.E. 118*. First semester. Mr. Uhler

C.E. 124. Structural Theory (3).

An introduction to the study of stresses in indeterminate structures. Prerequisite: C.E. 15. Second semester. Mr. Eney

C.E. 125. Reinforced Concrete Design (3).

Theory of reinforced concrete; design of reinforced concrete buildings, bridges, and retaining walls. Prerequisites: C.E. 8 or 9; C.E. 15. First semester. Mr. Sutherland

C.E. 126. Concrete Laboratory (1).

The manufacture, properties, and testing of cement, mortar, and concrete; tests on reinforced concrete beams and columns. Prerequisite: C.E. 125. Fee, \$5.00. Second semester. Mr. Fuller

C.E. 128. Sanitary Engineering (3).

Fundamental principles of the design of water supply and sewerage systems and of water and sewage treatment plants. Prerequisite: C.E. 12 or 13, or Chem. 78. First semester. Mr. Payrow

C.E. 129. Sanitary Engineering Design (3).

Continuation of C.E. 128. Detailed design of water and sewage systems, including the complete design of a water and a sewage treatment plant. Prerequisite: C.E. 128. Second semester. Mr. Payrow

C.E. 130. Sanitary Engineering Laboratory (1).

Laboratory tests of water and sewage as applied to the operation of water and sewage plants. Visits of inspection are made to nearby water and sewage treatment plants. Prerequisite: C.E. 128. Second semester. Mr. Payrow

C.E. 131. Advanced Sanitary Engineering (3).

Engineering and public health; consideration of such matters as garbage and refuse collection and disposal, street cleaning methods, air conditioning, insect-borne diseases, rural sanitation, public health administration. Prerequisite: C.E. 128. Second semester. Mr. Payrow

C.E. 132. Advanced Highway Engineering (3).

Continuation of C.E. 16. A study of soil mechanics as related to sub-grade conditions and the stability of earth slopes. Prerequisites: C.E. 16; C.E. 8 and 12. Second semester. Mr. Becker

C.E. 135. Structural Welding (1).

The design of welded steel structures together with a study of current literature. A few periods will be devoted to the manual operation of making welds. Prerequisite: senior standing in civil or mechanical engineering. Second semester. Mr. Jensen

For Graduates

The following courses are open to engineering graduates only. The prerequisite for any course listed is the undergraduate course of similar title. Math. 217 and 218, Theory of Elasticity, may be included in a graduate major as though given in the department of civil engineering.

C.E. 201. Advanced Structural Theory (3).

The design and investigation of statically indeterminate structures of steel and reinforced concrete, including arches. First semester. Mr. Sutherland

C.E. 202. Advanced Structural Theory (3).

Continuation of C.E. 201. Second semester. Mr. Sutherland

C.E. 203. Plain and Reinforced Concrete (3).

A critical review of recent research. Correlation of research with analysis and design. Given in alternate years. Not given in 1941-42. First semester. Mr. Johnston

C.E. 204. Stability of Elastic Structures (3).

Theory of elastic stability and study of related research and design problems. Prerequisite: C.E. 212. Given in alternate years. Not given in 1941-42. Second semester.

Mr. Johnston

C.E. 205. Metal Structures (3).

Critical review of recent research in the field of steel structures. Correlation of research with analysis and design. Given in alternate years. Not given in 1940-41. First semester.

Mr. Johnston

C.E. 206. Special Methods of Analysis (3).

Analysis of complex stress distributions by the photoelastic and other methods. Prerequisite: C.E. 212. Given in alternate years. Not given in 1940-41. Second semester.

Mr. Johnston

C.E. 207. Sanitary and Hydraulic Engineering (3).

The design of reservoirs, tanks, and pipe lines for water supply systems, and of sewers and other appurtenances for sewerage systems. Inspection of existing plants, with reports thereon. First semester.

Mr. Payrow

C.E. 208. Sanitary and Hydraulic Engineering (3).

Continuation of C.E. 207. Second semester.

Mr. Payrow

C.E. 209. Structural Seminar (3).

Study of current discussion in the field of structural theory and design. First semester.

Messrs. Sutherland, Ippen

C.E. 210. Structural Seminar (3).

Continuation of C.E. 209. Second semester.

Messrs. Sutherland, Ippen

C.E. 212. Research Methods (3).

Study of principles of research as applied to engineering materials; measuring instruments, testing machines. First semester.

Mr. Johnston

C.E. 213. Structural Research (2 to 5).

Individual research problems with reports. First or second semester.

Mr. Johnston

C.E. 214. Mechanical Methods of Stress Determination (3).

Use of mechanical devices in investigation of special problems such as temperature deformations, foundation displacements and integral action of structures; theory of similitude. Given in alternate years. Not given in 1941-42. Second semester.

Mr. Eney

C.E. 217. Foundation Engineering (3).

Physical properties of soils; soil testing for foundation purposes; applications to theory and design. First or second semester.

Mr. Becker

C.E. 219. Structural Welding (3).

Continuous and non-continuous construction with welded connections; distortion effects; currents research. Given in alternate years. Not given in 1941-42. Second semester. Mr. Jensen

C.E. 231. Hydrodynamics (3).

Fundamentals of fluid motion; flow phenomena in closed and open channels; advanced practical problems. First semester. Mr. Ippen

C.E. 232. Run-Off and Stream-Flow (2).

Hydrologic studies. Soil conservation, flood prevention and control, hydraulic structures. First semester. Mr. Ippen

C.E. 233. Hydraulic Laboratory Practice (2).

Study of theory and methods of hydraulic experimentation simultaneously with laboratory work. Second semester. Mr. Ippen

C.E. 235. Hydraulic Research (2 to 5).

Individual research problems with reports. First and second semesters. Mr. Ippen

ECONOMIC STATISTICS

See Accounting

ECONOMICS AND SOCIOLOGY

PROFESSOR DIAMOND, ASSISTANT PROFESSOR JONES
MESSRS. DANHOF, TRIPP, AND MCKINLEY
DEAN CAROTHERS

ECONOMICS

Eco. 1. Industrial Evolution (3).

An introductory course outlining the gradual development of economic organization with special attention to the stages of economic progress and social institutions growing out of these stages. First semester.

Eco. 3. Economics (3).

A general course in the principles of economics, covering the fundamental forces governing the production, distribution, and consumption of wealth, with emphasis on value, exchange, money, rent, interest, profits, and wages. Prerequisite: sophomore standing. First semester.

Eco. 4. Economics (3).

Continuation of Eco. 3. Prerequisite: Eco. 3. Second semester.

Eco. 11. Marketing (3).

The distribution of consumer goods, with emphasis upon the wholesale and retail structure, credit, instalment selling, pricing and price cutting, and marketing practice. Prerequisite: *Eco. 4.* First semester.

Eco. 12. Marketing (3).

A continuation of Eco. 11, with emphasis upon the principles of retailing. Prerequisite: Eco. 11. Second semester.

Eco. 50. Economic Geography (3).

A survey of world resources and world trade, with special reference to the chief economic materials and the geographic and economic factors responsible for the position of the United States in the economic world. Prerequisite: Eco. 1. Second semester.

Eco. 60. Insurance (3).

A non-mathematical course in the economic principles and business practice of insurance, particularly life, fire, and casualty insurance. Prerequisite: *Eco. 4*. First semester.

For Advanced Undergraduates and Graduates

Eco. 107. Advanced Economics (3).

An advanced course in the principles of economics, dealing especially with the theory of the distribution of wealth, the nature of the productive process, the history of economic doctrines, and proposed plans of economic reform such as socialism. Prerequisite: *Eco. 4*. First semester.

Mr. Diamond

Eco. 108. Advanced Economics (3).

Continuation of Eco. 107. Prerequisite: *Eco. 4*. Second semester.

Mr. Diamond

Eco. 113. Advertising (3).

The principles, practices, and problems of advertising with special reference to its social and economic aspects. Prerequisite: *Eco. 4*. First semester.

Mr. Jones

Eco. 114. Selling and Sales Management (3).

The principles and practices of modern selling and sales management. The function of distribution in modern management. Prerequisite: *Eco. 4*. Second semester.

Mr. Jones

Eco. 133. Labor Problems (3).

The economics of labor, the history of labor movements in the United States, forms of labor organizations, and the method and policies of trade unions. Prerequisite: *Eco. 4*. First semester.

Mr. Diamond

Eco. 134. Labor Problems (3).

A continuation of Eco. 133. The relations of labor to the courts; social legislation. Unemployment, employee health, accidents, personnel work, and employee representation. Prerequisites: *Eco. 4*; Eco. 133. Second semester.

Mr. Diamond

Eco. 171. Readings in Economics (3).

Readings in various fields of economics, designed for the student who has a special interest in some field of economics not covered by the regu-

larly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Messrs. Diamond, Jones

Eco. 172. Readings in Economics (3).

Continuation of Eco. 171. Prerequisites: senior standing and consent of the head of the department. Second semester. Messrs. Diamond, Jones

SOCIOLOGY

Soc. 51. Social Institutions (3).

A one-semester course outlining the fundamental institutions of the social order, with special reference to their origin, growth, and present interrelations. Prerequisite: *Eco. 4*. First semester.

For Advanced Undergraduates and Graduates

Soc. 161. Sociology (3).

The nature and the growth of social institutions, with emphasis on evolution, racial developments, social stratification, and the social problems connected with the institutions of private property, family organization, and sex. Prerequisite: *Eco. 4*. First semester. Mr. Diamond

Soc. 162. Social Problems (3).

Special problems of contemporary society, including population trends, crime, public health, poverty, child welfare, the handicapped, etc. Prerequisite: *Eco. 4*. Second semester. Mr. Diamond

Soc. 171. Readings in Sociology (3).

Readings in various fields of sociology, designed for the student who has a special interest in some field of sociology not covered by the regularly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Mr. Diamond

Soc. 172. Readings in Sociology (3).

Continuation of Soc. 171. Prerequisites: senior standing and consent of the head of the department. Second semester. Mr. Diamond

EDUCATION

PROFESSORS H. P. THOMAS AND CONGDON
ASSOCIATE PROFESSOR LAFERTY, ASSISTANT PROFESSOR WHITE
MR. LARAMY (LECTURER)

Attention is also called to the statement concerning preparation for teaching in the description of the College of Arts and Science.

Educ. 0. Effective Study Methods.

A practical course in study techniques and in the tools of study, including reading and fundamentals of mathematics, as the needs of individual students may require. An extensive testing program is carried on to assist the student in adjusting himself. Prerequisite: *consent*

of the instructor. Second half of first semester. No credit toward graduation.

Educ. A. Effective Study Methods (3).

A continuation of Educ. 0. Prerequisite: Educ. 0. Second semester.

Educ. 1. Introduction To Education (3).

A general introduction to the field of education, giving a broad survey of the work of the teacher and of the public schools. Required for the college provisional certificate. Should be taken during the junior year or earlier. First and second semesters.

Educ. 20. Educational Psychology (3).

An introductory course furnishing a psychological foundation immediately related to educational problems and practice. Practical problems involving analysis of designated material are assigned regularly for solution and report. Required for the college provisional certificate. Should be taken during the junior year. Prerequisite: *Psych. 1.* Second semester.

Educ. 51. Principles of High School Teaching (3).

Basic methods of secondary instruction, including the objectives of education in relation to the curriculum; socialized procedure; problem-project method; contract plans; types of teaching related to different fields; directed study; organization of courses around criticized objectives and the conduct of classes along the lines of individualized instruction. Recommended for the college provisional certificate. Should be taken with Educ. 53. Prerequisites: Educ. 1 and 20. First semester.

Educ. 53. Observation of Secondary School Teaching (3).

Study, directed observation, and discussion of the various phases of teaching activity in high schools in or near Bethlehem. The class meets two hours each week. In addition, detailed reports are required for sixty observation periods. Required for the college provisional certificate. Prerequisites: Educ. 1 and 20; Educ. 51 concurrently. First semester.

Educ. 54. Practice Teaching of Secondary School Subjects (3).

An intensive practical application of the principles of teaching to classroom conditions. The class meets two hours each week, in sections according to major interests, for the study of teaching procedure, actual organization, and planning of courses around definite objectives. A minimum of sixty periods of acceptable supervised practice in classroom instruction is required. Students must have at least one free hour at the same time each day throughout the week. Required for the college provisional certificate. Prerequisite: *Educ. 53 and fifteen semester hours in each subject the candidate expects to teach.* Second semester.

Educ. 56. Practice Teaching of Secondary School Subjects (3).

A continuation of Educ. 54 required of students who desire certification in New Jersey. Teaching must be done in a field for which practice teaching credit has not previously been granted. Prerequisite: *Educ.*

53 and fifteen semester hours in the subject the candidate expects to teach. Educ. 54 may be taken concurrently. Second semester.

For courses in special methods, see Lat. 109 and 110, in the department of Latin.

For Advanced Undergraduates and Graduates

Educ. 121. The Diagnosis and Adjustment of Reading Difficulties (3).

The psychology of reading as related to learning difficulties. The fundamental skills of reading, including eye movements, the measurement and diagnosis of reading difficulties, and recent experiments with remedial procedure. Practice in the development of material for remedial instruction. Prerequisite: *consent of the instructor*. Not given in 1941-42. First or second semester. Mr. Lafferty

Educ. 130. History of Education in Europe (3).

A survey of the Greek, Roman, and early Christian periods; late medieval and early modern periods; European movements since the French Revolution and their implications for American education. Not given in 1941-42. Second semester. Mr. Crum

Educ. 131. History of Education in the United States (3).

The development of primary, secondary, and higher education in the United States. The aims, curricula, methods, and systems of education, through five periods from Colonial times to the present, in relation to the social conditions and processes. Prerequisite: junior standing. First semester. Messrs. Thomas, White

Educ. 150. Principles of Secondary Education (3).

The aims, organizations, and materials of secondary education, characteristics of secondary school pupils, and a general treatment of the problems of secondary education. An introductory course in the field of secondary education. Recommended for the college provisional certificate. Prerequisite: *consent of the instructor*. Second semester. Messrs. Congdon, Lafferty

Educ. 151. Organization of Materials of Instruction (3).

A practical course for the teacher in service offering opportunity for cooperative planning of courses and units of instruction. Applying the principles of curriculum construction to the selecting, assembling, and organizing of materials of instruction. The teacher is expected to work in his field of special interest. Prerequisite: *consent of the instructor*. Not given in 1941-42. First semester. Mr. White

Educ. 171. Elementary Educational Statistics (3).

Designed to give teachers and administrative officers the techniques necessary to enable them to gather data and present the results of their work in their classrooms and schools. Provides a practical knowledge of the simpler statistical methods for use in handling common problems and

in understanding educational literature. Prerequisite: *consent of the instructor*. Not given in 1941-42. First semester.

Messrs. Thomas, Lafferty

Educ. 190. Visual Instruction (3).

Types of visual aids, the special value of each, their use in different subjects, the psychological basis for the use of such material and the standards for the selection of visual-sensory aids. Required for the permanent college certificate. May be completed as an undergraduate course or may be completed after graduation before application is made for the permanent college certificate. Second semester. Mr. White

For Graduates

The major in education on the graduate level is intended primarily for students preparing for school administration and supervision. If any such student plans to combine administration and teaching he is expected to supplement his major with such further work in his field of teaching as his adviser in his field of teaching and the head of the department of education may recommend.

For students who want the master's degree for high school teaching, a major in education is not advised. The major should be taken in the field in which the student is teaching or preparing to teach, under the guidance of the head of the department in that field. Collateral work in education for these students is recommended. Courses recommended include Educ. 151, 257, 272, and 282.

Students interested in preparing for high school positions in guidance and counseling should consult with the head of the department.

At least four semester courses in education are prerequisite for a graduate major in this field. The prerequisites may be taken concurrently with a partial major program. Attention is called to Educ. 121, 130, 131, 150, 151, 171, and 190, all of which are open to advanced undergraduates and graduate students, and which may be accepted toward a major or as collateral work in education.

Educ. 219. Social Policy and Education (3).

A critique of the aims of education in the modern social order. The nature, needs, and adjustments of modern industrial society; the conflicting demands upon education by a changing civilization as represented by modern social points of view; the implications, for education, of contemporary American philosophy of democratic social progress. Prerequisite: *consent of the instructor*. First semester. Mr. Lafferty

Educ. 220. Advanced Educational Psychology (3).

Study and practice of techniques and methods involved in making a detailed psychological analysis of the pupil, particularly in relation to school problems. Prerequisite: consent of the instructor. Second semester.

Mr. Lafferty

Educ. 222. Education of Exceptional Children (3).

Methods of instruction and provision of materials for children who differ markedly from the normal, i.e., gifted, subnormal, and maladjusted. The problems of the teacher in a system that makes little provision for the exceptional child. Actual case studies of pupils are required. Prerequisite: consent of the instructor. Not given in 1941-42. Second semester.

Mr. Lafferty

Educ. 223. Psychology of School Subjects (3).

An analysis of the psychological development and behavior of pupils in connection with school subjects at all levels. Diagnostic work. Each student has an opportunity to emphasize the subject of his special interest. Prerequisites: *Educ. 1, 20, and 51, or equivalent.* Summer session.

Mr. Lafferty

Educ. 243. Elementary School Administration (3).

The major problems of organization and administration of elementary schools. Types of organization, pupil promotion, time allotment, service agencies, and plant and equipments. Required for a principal's certificate. Second semester.

Mr. White

Educ. 244. The Elementary School Curriculum (3).

Problems of curriculum development in the first six grades; subject matter placement, program making for different types of schools, regular vs. special subjects, articulation, and similar problems. Not given in 1941-42. First semester.

Mr. White

Educ. 246. Elementary School Supervision (3).

Methods, materials, organization, and evaluation of supervision. Each student will be required to develop a supervisory program for a subject or a school. Not given in 1941-42. Second semester.

Mr. White

Educ. 253. Secondary School Administration (3).

The major problems of organization and administration of secondary schools: program of studies, teaching staff, pupil personnel, plant and equipment, and community relationships. Required for a principal's certificate. Prerequisite: *Educ. 150 or its equivalent.* First semester.

Mr. Thomas

Educ. 254. The Secondary School Curriculum (3).

Related to Educ. 253, but organized in such a way that it may be taken independently. Methods of study of curriculum problems, the selection of subject matter in various fields, the principles of program construction, and similar problems. Prerequisite: *Educ. 150 or its equivalent.* Not given in 1941-42. Second semester.

Mr. Thomas

Educ. 256. Supervision in Secondary Schools (3).

Related to Educ. 253 and 254, but may be taken independently. The purpose of supervision, a program for the improvement of teaching, the evaluation of teaching, measurement, supervisory relationships, and similar problems involved in the supervision of instruction in secondary schools. Prerequisite: *Educ. 150 or its equivalent*. Second semester.

Mr. Thomas

Educ. 257. Modern Trends in Teaching (3).

Designed for the teacher in service and for principals who wish a knowledge of the most recent developments in the trends and techniques of teaching. Special attention is given to experimental studies in the field of method. Prerequisite: *consent of the instructor*. First semester.

Mr. White

Educ. 263. Public School Administration (3).

A systematic treatment of the problems of administration, local, state, and national. The newer developments which are modifying educational administration: state authorization and organization, the board of education, the superintendent of schools, personnel management, business administration, financial support, and public relations. Not given in 1941-42. First semester.

Messrs. Thomas, Congdon, White, Laramy

Educ. 264. Foundations of Curriculum Construction (3).

Principles of curriculum construction which underlie the reorganization of the program of studies for elementary and secondary schools. Consideration of the origin and background of the curriculum, methods of organization, state, county, and city programs, curriculum planning and development, techniques for developing materials, and similar pertinent topics. First semester.

Mr. White

Educ. 266. Supervision of Instruction (3).

Analysis of the principles underlying the organization and supervision of instruction. Applications to specific teaching situations. No lines will be drawn between the elementary and the secondary school. Summer session.

Messrs. Thomas, White

Educ. 272. Educational Tests and Measurements (3).

Selection of educational tests, organization of a testing program, use of tests in classification, construction of classroom tests, use of tests in improving teaching, and diagnosis of pupil difficulties. For advanced work in this field attention is called to the seminar and individual research courses. Not given in 1941-42. Second semester.

Messrs. Thomas, White

Educ. 273. Diagnostic and Remedial Teaching (3).

The analysis and treatment of difficulties in the various subjects. The student may select any academic subject, in which he has adequate background, as his field of work. Practice is given in the development of materials, and actual work with failing pupils is expected. Prerequisite: *consent of the instructor*. Summer session.

Mr. Lafferty

Educ. 282. Educational and Vocational Guidance (3).

General principles of guidance. Discovery of interests and abilities, study of occupations, study of educational opportunities, guidance activities, group programs, student personnel problems. Current practices are carefully examined. Required for guidance certificates. For advanced work in this field attention is called to the seminar and individual research courses. Second semester. Mr. Thomas

Educ. 291-292. Seminars (3).

One seminar is organized in each half year provided three or more students elect such work. These courses do not duplicate the courses of individual research. It is the purpose of seminar courses to provide for cooperative study of special problems in the field of elementary and secondary education. Prerequisite: *consent of the instructor*. First and second semesters. Messrs. Thomas, Congdon, White, Laramy

Educ. 293-294. Individual Instruction, Field Work, or Research (3).

Open to students with appropriate preparation and needs for pursuing independent investigation. The student must have shown interest and capacity for advanced work in the chosen field evidenced in part by an approved plan of work. Prerequisite: *consent of the instructor*. First and second semesters. Messrs. Thomas, Congdon, Lafferty, White, Laramy

Educ. 295-296. Seminar in School Administration (3).

Cooperative study of special problems in the field of school administration. Appropriate problems include: finance, building programs, business management, and school law. Prerequisite: *consent of the instructor*. First and second semesters. Messrs. Thomas, Congdon, White, Laramy

ELECTRICAL ENGINEERING

PROFESSORS BEWLEY AND BEAVER
ASSOCIATE PROFESSORS HIBSHMAN, A. R. MILLER, AND KNUTSON
ASSISTANT PROFESSORS GRUBER AND BRUNETTI
MR. MODE

E.E. 17. Electrical Engineering Proseminar (1).

A weekly meeting for discussion of topics from the current journals of theoretical and applied electricity. Presentation of papers on assigned topics. Prerequisites: *E.E. 36, E.E. 37*. First semester.

E.E. 18. Electrical Engineering Proseminar (1).

Continuation of E.E. 17. Prerequisites: *E.E. 17*. Second semester.

E.E. 23. Thesis for Degree of B.S. in Electrical Engineering (3).

Independent work in theory, experimental research, or designing, with frequent reports of progress, supplemented by reference reading. The subject of the thesis is to be chosen in the first semester though the work

upon which it is based may be done in either semester. Prerequisite: senior standing. First or second semester.

E.E. 24. Summer Work.

During the vacation following the junior year each student in electrical engineering is required to spend at least eight weeks in getting practical experience in some approved shop or plant. A written report on the shop or plant, and the experience gained therein, is due December 2. These reports should contain such calculations, photographs, drawings, and plots as each individual case may require.

E.E. 32. Direct Current Machinery (4).

Direct current circuits; magnetic circuits; direct current machine construction, operation, and control; generated voltages, forces on conductors, armature windings, machine characteristics. Prerequisites: *Phys. 24, Math. 13; Math 14 concurrently*. Second semester.

E.E. 33. Direct Current Laboratory (2).

A coordinated laboratory course supplementing the classroom work in E.E. 32. Experimental studies and tests of direct-current machines and appliances, including characteristics, regulations, efficiency, etc. Fee \$6.00. Prerequisite: *E.E. 32, concurrently*. Second semester.

E.E. 34. Alternating Current Circuits (3).

Alternating current conceptions; laws for series and parallel circuits containing R, L, and C; vector methods; complex quantities; single and polyphase circuits and networks; power; Fourier Series; harmonics; superposition. Prerequisites: *E.E. 32, Math. 14; Math. 106 concurrently*. First semester.

E.E. 35. Alternating Current Circuits Laboratory (1).

Supplements E.E. 34. Alternating current circuit experiments, with oscillographic studies. Fee \$6.00. Prerequisites: *E.E. 32, Math. 14, E.E. 34 concurrently*. First semester.

E.E. 36. Alternating Current Machines (3).

The electrical, magnetic, and mechanical features of single and polyphase transformers and induction motors. Prerequisites: *E.E. 34, E.E. 37 concurrently*. Second semester.

E.E. 37. Alternating Current Machine Laboratory (2).

Supplements E.E. 36. Laboratory tests on transformers, transformer banks and induction motors. Fee \$12.00. Prerequisite: *E.E. 36 concurrently*. Second semester.

E.E. 38. Alternating Current Machines (3).

A continuation of E.E. 36. Treats the electrical, magnetic, and mechanical features of synchronous generators, motors, and converters. Parallel operation. Prerequisites: *E.E. 36, E.E. 37, E.E. 39 concurrently*. First semester.

E.E. 39. Alternating Current Machine Laboratory (2).

A continuation of E.E. 37, supplementing E.E. 38. Laboratory tests on synchronous generators, motors, and converters. Measurement of constants, parallel operation, calculations. Fee \$12.00. Prerequisites: *E.E. 38 concurrently*. First semester.

E.E. 40. Electronic Devices (3).

A study of the fundamentals of electronic discharges in vacua and gases, operating characteristics of vacuum and gaseous tubes, mercury arc rectifiers, photoelectric cells, cathode ray oscillographs, etc.; emphasis on application of electronic devices in industry. Prerequisites: *E.E. 34 or E.E. 52*. Second semester.

E.E. 50. Dynamos and Motors, General (2).

The principles and practice of direct-current engineering, including the elementary theory, construction, operation, and control of direct-current generators and motors, electromagnets, solenoids; illustrative problems. A one-semester course designed for non-electrical engineers. Prerequisites: *Math. 13; Phys. 24*. First and second semesters.

E.E. 51. Dynamo Laboratory, Beginning (1).

Introductory course supplementing the class work of E.E. 50. Experimental studies and tests of direct-current generators and motors for characteristics, regulation, efficiency, etc. Prerequisite: *E.E. 50 concurrently*. Fee \$6.00. First and second semesters.

E.E. 52. Alternating Currents, General (2).

Continuation of E.E. 50; the principles and practice of alternating-current engineering; the theory of alternating currents with applications to alternating-current generators, motors, transformers, and other apparatus; systems of transmission and distribution. Prerequisites: *Math. 13; Phys. 24; E.E. 50*. First and second semesters.

E.E. 53. Dynamo Laboratory, Intermediate (1).

Continuation of E.E. 51, supplementing the class work of E.E. 52 and 54. Advanced testing of direct-current machines; practice in operating and testing alternating-current apparatus. Prerequisite: *E.E. 52 concurrently*. Fee, \$6.00. First and second semesters.

E.E. 54. Electrical Engineering, Applications (2).

Systems of generation, transmission, distribution, and utilization taken up in order, under utilization special attention given to the application of electric motors to various industries; estimates and costs; problems. Particularly adapted to students who do not specialize further along electrical lines. Prerequisite: *E.E. 50; E.E. 52*. Second semester.

E.E. 55. Dynamo Laboratory, Advanced (1).

Continuation of E.E. 53, consisting of advanced direct- and alternating-current studies and tests. Primarily for non-electrical students taking more than the usual two semesters of dynamo laboratory. Prerequisites: *E.E. 50; E.E. 53*. Fee, \$6.00. Second semester.

E.E. 58. Electrical Machinery (3).

A short course covering the theory and application of direct- and alternating-current apparatus adapted to students requiring a minimum of electrical engineering, including: direct-current and alternating-current circuit theory, construction and operation of electrical machinery. Prerequisites: *Math. 13, Phys. 24*. First or second semester.

E.E. 59. Dynamo Laboratory, Combined (1).

A brief course covering the simpler tests on direct- and alternating-current circuits and apparatus. Prerequisite: E.E. 58, previously or concurrently. Fee, \$6.00. First or second semester.

For Advanced Undergraduates and Graduates**E.E. 101. Electric Power Stations (3).**

Hydro stations; steam stations; prime movers; auxiliary equipment; bus systems; cables; switch gear; circuit breakers; switchboards; measuring and protective devices; layout and design; operation and management; plant economics and rate making; visits to neighboring plants. Prerequisites: *E.E. 38, concurrently, M.E. 23, C.E. 13*. First semester.

Mr. Beaver.

E.E. 102. Distribution Systems (3).

Substations; D.C. and A.C. networks; underground cables; overhead distribution; conversion apparatus; circuit breakers; relays; protective devices; short-circuit calculation; economics of distribution. Prerequisite: E.E. 101. Second semester.

Mr. Beaver.

E.E. 103. Industrial Applications (3).

Motor characteristics; load characteristics; control devices; conversion apparatus; power factor correction; drives for steel mills, sugar mills, ore bridges, saw mills, paper mills, cement mills, ore mines and mills, etc. Prerequisite: *E.E. 38 concurrently*. First semester.

Mr. Hibshman

E.E. 104. Electric Transportation (3).

Electric locomotives; rolling equipment; track; feeders and trolley; sub-stations; conversion apparatus; speed-time curves; schedules; power requirements; trolley coaches; gas-electric buses; electric ship propulsion; economics of electrical transportation. Prerequisites: *E.E. 38, E.E. 103*. Second semester.

Mr. Hibshman

E.E. 131. Electric and Magnetic Fields (3).

The calculation and construction of electric and magnetic fields for conductors, plates, vacuum tubes, slots, teeth, etc.; analogous problems in fluid flow. The methods of the theory of functions of a complex variable and of Fourier series and integrals are introduced in sufficient detail to serve in the analytical work; the rules for free hand plotting are derived and applied. Prerequisites: *Math. 106; E.E. 38*. First semester.

Mr. Bewley

E.E. 132. Electric Transients (3).

Electrical, mechanical, and heat flow transients of circuits, transmission lines, electrical machinery, and power systems. Operational calculus, to include Fourier integral, Bromwich integral, Laplacian transform, and the direct operational method. Prerequisites: *Math. 106*; *E.E. 131*. Second semester. Mr. Bewley

E.E. 133. Transmission Lines (3).

Long distance transmission of power; determination of line constants; geometric mean distances; corona; interference; differential equations and solutions; general circuit constants; regulation; losses and efficiency; mechanical design of lines; economics of power transmission. Prerequisites: *Math. 106*, *E.E. 38* concurrently. First semester. Mr. Bewley

E.E. 134. Transmission Line Transients (3).

Traveling waves; free and forced oscillations; reflections; transition points; multi-conductor systems; multi-velocity waves; attenuation and distortion; lightning surges; switching surges; arcing grounds; protective devices. Surges in transformer and machine windings. Prerequisites: *Math. 106*, *E.E. 133*, *E.E. 132* concurrently. Second semester. Mr. Bewley

E.E. 135. Symmetrical Components (3).

The solution of unbalanced polyphase circuits by means of symmetrical components; system faults, open-circuit and shortcircuit current and voltage calculations; sequence impedances of transmission lines, transformer banks, etc.; metering. Prerequisites: *E.E. 38*, *E.E. 39*. First semester. Mr. Miller

E.E. 136. System Stability (2).

Steady state and transient power limits of transmission systems. Electro-mechanical characteristics of electrical machines and networks. Prerequisites: *E.E. 135*, *E.E. 137* and *E.E. 138* concurrently. Second semester. Mr. Miller

E.E. 137. Advanced Machine Theory (3).

The transient theory of a-c machines. Balanced and unbalanced conditions; time constants. Approximate and rigorous solutions. Prerequisites: *E.E. 135*, *E.E. 132* and *E.E. 138* concurrently. Second semester. Mr. Miller

E.E. 138. Transients Laboratory (1).

An oscillographic laboratory study of transmission line transients, system stability, and machine transients. Prerequisites: *E.E. 134*, *E.E. 136*, *E.E. 137* concurrently. Fee \$6.00. Second semester. Mr. Mode

E.E. 141. Radio Communication (3).

The principles of radio communication. A study of high frequency alternating currents, resonant circuits, audio and radio frequency amplifiers and oscillating circuits. Laboratory measurements on audio and radio circuits. Prerequisite: *E.E. 34*, or *E.E. 52*. Fee \$6.00. First semester. Mr. Knutson

E.E. 142. Radio Communication (3).

Continuation of E.E. 141. A study of detection, amplitude and frequency modulation, television, antennae, and radiation. Laboratory measurements on audio and radio circuits. Prerequisite: *E.E. 141*. Fee \$6.00. Second semester. Mr. Knutson

E.E. 143. Wire Communication (3).

Introductory theory of networks. Bridge and coupled circuits; impedance matching; telephone circuits; transmission lines at audio and carrier frequencies. Communication apparatus. Prerequisite: *E.E. 34*. First semester. Mr. Brunetti

E.E. 144. Wire Communication (3).

Continuation of E.E. 143. Wave filters, repeaters, corrective and balancing networks. Laboratory measurements on wire communication circuits. Fee \$6.00. Prerequisite: *E.E. 143*. Second semester.

Mr. Brunetti

E.E. 145. Electro-Acoustics (3).

The basic elements of sound generation, transmission and reproduction by electrical means, electrical analogies for vibrating systems, sound systems and noise measurements. Prerequisites: *E.E. 141*, *Math. 121*. Second semester. Messrs. Knutson, Brunetti

For Graduates

For graduate students intending to take their major subjects in electrical engineering, a preparation equivalent to the work required for the B.S. in E.E. degree is necessary.

Graduate courses are given to qualified men from the industries of the surrounding district.

E.E. 203. Electrical Design (3).

Predetermination by calculation of the characteristics, regulation, and performance of electrical machinery. Analysis and use of design constants. Design of special machines. First semester. Mr. Beaver

E.E. 204. Electrical Design (3).

Continuation of E.E. 203. Second semester.

Mr. Beaver

E.E. 209. Radio Communication (3).

The theory underlying the various sending and receiving systems and the propagation of electromagnetic waves combined with the experimental work in connection with the department's wireless equipment. First semester. Mr. Knutson

E.E. 210. Radio Communication (3).

Continuation of E.E. 209. Second semester.

Mr. Knutson

E.E. 211. Electric Transients (3).

The theory of transients in the more complicated types of electrical circuits, electrical apparatus, and transmission lines, as applied in electri-

cal engineering; oscillograms of all transient phenomena discussed taken in the laboratory. Two lectures and one laboratory period per week. Fee \$6.00. First semester. Mr. Miller

E.E. 212. Electric Transients (3).

Continuation of E.E. 211. Treatment of circuits and transients by operational calculus methods. Second semester. Mr. Miller

E.E. 213. Advanced Theory of Power Transmission (3).

Methods of determining the exact solution of transmission line problems; line transients and short circuits; problems on power limits and stability of systems. First semester. Mr. Miller

E.E. 214. Advanced Theory of Power Transmission (3).

Continuation of E.E. 213. Second semester. Mr. Miller

E.E. 215. Vacuum Tubes and Their Applications (3).

A mathematical and physical consideration of electronic discharges in vacuum and in gases. Applications to the diode, triode, tetrode, pentode, photoelectric cells, etc. A detailed study of the static and dynamic characteristics of these tubes. The use of vacuum tubes in radio, television, rectification, and miscellaneous industrial fields. First semester. Mr. Knutson

E.E. 216. Vacuum Tubes and Their Applications (3).

Continuation of E.E. 215. Second semester. Mr. Knutson

E.E. 217. The Economics of Electric Power (3).

A treatment of economic principles as applied to the design, selection, and use of electrical apparatus, plants, and systems; the adjustment of fixed charges and operating expenses by the application of Kelvin's law to problems of generation, transmission, conversion, distribution, and utilization of electric power. First semester. Mr. Beaver.

E.E. 218. The Economics of Electric Power (3).

Continuation of E.E. 217. Second semester. Mr. Beaver

E.E. 219. Theory of Networks (3).

Consideration of electrical networks from a general standpoint. Characteristics of two and four terminal networks. Foster's, Cauer's and Bartlett's theorems. Transformations by matrix manipulation. Theory of long lines. First semester. Mr. Brunetti

E.E. 220. Theory of Networks (3).

Continuation of E.E. 219. Advanced theory of wave filters. Simulative and corrective networks. Transient behavior of long lines and filters. Second semester. Mr. Brunetti

E.E. 221. Electro-Acoustics (3).

The principles and apparatus involved in the generation, transmission, and reproduction of sound by electrical means; a study of acoustical lines

ENGLISH

and filters, acoustical measurements, sound re-enforcing systems, super-sonics Prerequisite: E.E. 142 or its equivalent. First semester.

Messrs. Knutson, Brunetti

E.E. 222. Electro-Acoustics (3).

Continuation of E.E. 221. Second semester. Messrs. Knutson, Brunetti

E.E. 223. Tensor Analysis of Electric Circuits and Machines (3).

The application of dyadics, matrices, and tensors to the theory of electric circuits and machinery. Static networks, network theorems, vacuum tube circuits, transformers, and transmission lines. First semester.

Mr. Bewley

E.E. 224. Tensor Analysis of Electric Circuits and Machines (3).

Continuation of E.E. 223. The generalized machine: equations of motion, voltage, torque, small oscillations and power for holonomic, non-holonomic and quasi-holonomic reference systems. Applications to all machines constituting special cases of the generalized machine. The equations of Lagrange, Maxwell, and Maxwell-Lorentz are used as starting points in the general theory. Second semester.

Mr. Bewley

ENGLISH

PROFESSOR SMITH, ASSOCIATE PROFESSORS RILEY AND SEVERS
ASSISTANT PROFESSORS SLOANE, CALLAGHAN AND CLIFFORD
MESSRS. RIGHTS, STRAUCH, CHRISTENSEN, HORNING, JONES,
TODD, AND WATERS

The freshmen are distributed, upon the basis of preliminary tests given during freshman week, into three groups: low, Engl. 0; middle, Engl. 1; high, Engl. 3a.

Engl. 1 and 2 constitute the minimum freshman requirement. Since no college credit is given for Engl. 0, students in the low group are required to take Engl. 2 either in summer session or during the second year, in order to complete the six required hours. A student whose work shows that he has been placed in the wrong group may be transferred to the higher or to the lower group at any time during the year, if his instructor recommends and the head of the department approves the transfer.

Engl. 0. Elementary Composition (0).

Drill in the fundamentals of English grammar and in the mechanics of writing. First and second semesters.

Engl. 1. Composition and Literature (3).

A rapid review of functional grammar and of sentence and paragraph structure. Practice in outlining and original composition. Readings in expository prose. First and second semesters.

Engl. 2. Composition and Literature (3).

Continuation of Engl. 1. Practice in expository writing, including documented papers and reports. First and second semesters.

Engl. 3a. Types of World Literature (3).

A study of the masterpieces of world literature. Written and oral reports. Required of freshmen in the high group. First semester.

Engl. 3b. Types of World Literature (3).

Continuation of Engl. 3a. Second semester.

ENGLISH LITERATURE AND COMPOSITION

Students wishing to major in English literature should take as preliminary work either Engl. 3a, 3b, or 4, 5, 8, 9, or such equivalent courses as may be recommended by the head of the department. They should then elect two English courses in each semester of the junior year and at least two in each semester of the senior year. Students working for honors take a seminar course in which they prepare a thesis as part of the honors requirement.

Engl. 4. A Study of the Drama (3).

Reading and critical study of types of the drama; theories of the drama; the drama and the stage; the drama as a criticism of life. Prerequisites: Engl. 1 and 2. First semester.

Engl. 5. A Study of the Drama (3).

Continuation of Engl. 4. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 6. The Modern Essay (3).

A study of modern essayists as interpreters of the various aspects of their age. Practice in the writing of familiar and informational essays. Prerequisites: Engl. 1 and 2. Not given in 1941-42. First semester.

Engl. 7. The Short Story (3).

A critical study of the short story, English, American, and continental. Class discussions, extensive collateral reading, and reports. Prerequisites: Engl. 1 and 2. Not given in 1941-42. Second semester.

Engl. 8. English Literature (3).

A survey of English literature from *Beowulf* through the Pre-romantics, with selected readings. Prerequisite: Engl. 1 and 2. First semester.

Engl. 9. English Literature (3).

A survey of English literature from Wordsworth to Housman. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 18. The Novel (3).

A study of the types of the novel. Reading and reports. Lectures on the history of the novel in England and America. Prerequisites: Engl. 1 and 2. First semester.

Engl. 19. The Novel (3).

Continuation of Engl. 18. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 20. American Literature, 1607-1855 (3).

A survey of the major writers from the settlement of America to the Civil War, including Franklin, Paine, Bryant, Emerson, Thoreau, Longfellow, Whittier, Poe, Holmes, Lowell, Irving, and Melville. Lectures and class discussions. Prerequisites: Engl. 1 and 2. First semester.

Engl. 21. Modern American Literature (3).

A study of the development of American literature from Whitman to the present day. Lectures and class discussions. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 41. Business Letters (3).

Rhetorical and psychological principles and forms in modern business communication. Practice in writing letters of inquiry, request, reply, acknowledgment, adjustment, credit, collection, sales, business-promotion, and application. Oral reports on various communicative problems, inter-office communication, foreign correspondence, advertising, release of publicity, dictation, supervision, and legal aspects of correspondence. Prerequisites: Engl. 1 and 2. First and second semesters.

Engl. 42. Technical Writing (3).

Study and practice in forms and methods of technical exposition, description, definition, classification; the technical report, abstract, editorial, and book review; the semipopular article. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 81. Undergraduate Thesis (3).

Open to advanced undergraduates who wish to submit theses in English. First semester.

Engl. 82. Undergraduate Thesis (3).

Continuation of Engl. 81. Second semester.

Engl. 83. Readings in English Literature (3).

Open to advanced students who wish to pursue special courses of readings in English Literature. First semester.

Engl. 84. Readings in English Literature (3).

Continuation of Engl. 83. Second semester.

For Advanced Undergraduates and Graduates

The courses in this group are open to students of junior standing.

Engl. 117. Contemporary Drama (3).

Types of the drama. Summer session.

Mr. Christensen

Engl. 118. American Literature (3).

Movements that have shaped American thought and feeling as expressed in the national literature: Puritanism, Americanism, Romanticism, Transcendentalism, Individualism, the Civil War, Democracy, the West, Realism, Internationalism, and Skepticism, as represented by Jonathan Edwards, Franklin, Paine, Longfellow, Poe, Emerson, Thoreau, Mark Twain, Henry James, and Henry Adams. Summer session.

Mr. Strauch

Engl. 120. The Novel (3).

The great masterpieces of prose fiction produced in England, in America, and on the Continent during the nineteenth and twentieth centuries. Development of types of the novel. The theory and technique of the novel. Summer session.

Mr. Riley

Engl. 121. Contemporary Literature (3).

Present-day American literature exclusive of the drama. Collateral readings and reports. Book fee, \$2.50. Prerequisites: six hours chosen from Engl. 3a, 3b; 4, 5; 6, 7; 8, 9; 18, 19; 20, 21, or from any of the courses in the 100 or 200 group. First semester.

Mr. Strauch

Engl. 122. Contemporary Literature (3).

Present-day English and European literature exclusive of the drama. Collateral readings and reports. Book fee, \$2.50. Prerequisites: same as for Engl. 121. Second semester.

Mr. Strauch

Engl. 123. Shakespeare and the Elizabethan Drama (3).

The development of the English drama, including the important plays of Shakespeare. First semester.

Mr. Smith

Engl. 124. Shakespeare and the Elizabethan Drama (3).

Continuation of Engl. 123. Second semester.

Mr. Smith

Engl. 125. English Literature of the Romantic Era (3).

Poetry and prose of the chief romantic writers—Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Landor, Lamb, Hazlitt—with consideration of the political, religious, and social problems of the period as they are exhibited in the literature. Readings and class discussions. First semester.

Mr. Severs

Engl. 126. English Literature of the Victorian Era (3).

Poetry and prose of the chief victorian writers—Tennyson, Brownning, Arnold, Clough, Rossetti, Morris, Swinburne, Macaulay, Carlyle, Mill, Newman, Ruskin—with consideration of the political, religious, and social problems of the period as they are exhibited in the literature.

Readings and class discussions. Not given in 1941-42. First semester.
Mr. Severs

Engl. 130. The Renaissance (3).

The non-dramatic literature of the English Renaissance, with especial emphasis upon the major writers of the late Elizabethan period and the 17th century. Spenser and Milton are not included. Second semester.

Mr. Riley

Engl. 131. Milton (3).

The life and works of John Milton in connection with the history of his times and the chief sources of his inspiration, including some study of Spenser and the Spenserians. Not given in 1941-42. Second semester.

Mr. Riley

Engl. 133. Restoration and Augustan Literature (3).

Prose and poetry from 1660 to 1745 with special emphasis upon the works of Dryden, Pope, and Swift, and some consideration of the influential ideas of Hobbes, Locke, Berkeley, and Hume. Second semester.

Mr. Sloane

Engl. 134. Age of Johnson (3).

English prose and poetry from 1745 to 1798. Dr. Johnson and his circle and the pre-romantics, including Burns and Blake. Not given in 1941-42. Second semester.

Mr. Clifford

For Graduates

Students desiring to take courses leading to the master's degree in English literature should have taken in their undergraduate work at least twelve semester hours of advanced courses in this field. Preliminary courses may be required of students to make up any deficiency before being admitted to candidacy for the master's degree.

Of the thirty hours required for the degree, at least eighteen must be in English major courses; fifteen of the thirty must be taken in courses chosen from the "200" group. A thesis, if required and accepted, is credited as six of the thirty hours. A student may choose collateral work amounting to six hours in courses not related to his major field, or take the full thirty hours in his major field. A final comprehensive examination, usually oral, covering the field of English literature, is required before the student is recommended for the degree.

Engl. 220. Graduate Seminar (3).

An intensive study of the works of an English author or a type of literature. Summer session.

Messrs. Smith, Riley, Severs

Engl. 221. Graduate Seminar (3).

Research and reports. First semester.

Mr. Smith

Engl. 222. Graduate Seminar (3).

Continuation of Engl. 221. Second semester.

Mr. Smith

Engl. 227. Anglo-Saxon (3).

A study of the Anglo-Saxon language and literature. Lectures and supplementary reading in the history of the English language and its relation to other Indo-European languages. First semester.

Mr. Riley

Engl. 228. Chaucer (3).

A study of the life and principal works of Chaucer, with some attention to his chief contemporaries. Readings and reports, class discussions. Second semester.

Mr. Severs

Engl. 229. Literary Criticism (3).

A course aimed to correlate and unify the student's previous work in literature by means of wide reading in critical literature and discussions of theories and schools of criticism. First semester.

Mr. Smith

Engl. 230. Literary Criticism (3).

Continuation of Engl. 229. Second semester.

Mr. Smith

Engl. 231. Graduate Thesis (3).

First semester.

Mr. Smith

Engl. 232. Graduate Thesis (3).

Second semester.

Mr. Smith

Engl. 233. Literature of the 14th Century (3).

Types of medieval literature with special attention to Langland, Gower, Chaucer. Summer session.

Mr. Severs

SPEECH

ASSISTANT PROFESSOR CALLAGHAN
MESSRS. RIGHTS AND HORNING

Speech 30. Fundamentals of Speech (3).

A foundation course designed to develop knowledge of the basic principles of speech, ability to speak effectively on the platform, enlargement of the oral vocabulary, standards of acceptable pronunciation, and a critical attitude toward contemporary public address. Prerequisites: Engl. 1 and 2. First and second semesters.

Speech 31. Business Speaking (3).

Principles of individual problem-solving and group policy-deliberation; practice in the conduct of personal interviews and conferences; delivery of reports, instructions, and explanations; promotional, inspirational, and good-will talks; after-dinner speeches; speeches of courtesy; telephone speaking. Prerequisite: Speech 30. Second semester.

Speech 32. Argument and Discussion (3).

The technique of investigation, analysis, evidence, inference, brief making, and refutation in oral argument. Participation in the various types of debate, conventional, cross-examination, and direct-clash, and in various forms of discussion, with emphasis on the panel and the symposium. Each student selects a topic for investigation and argument throughout the semester. Prerequisite: Speech 30. Second semester.

Speech 33. Parliamentary Procedure (1).

Study and drill in modern rules and methods, of conducting organized group-deliberation. Prerequisite: consent of the head of the department. First semester.

Speech 61. Dramatics (3).

The practical technique and production of plays; acting, stage-lighting, scenic design and execution, and student direction of plays. Each member must write either an original one-act play or a thesis upon any practical problem of the modern theater. One play is presented each semester. Prerequisites: Engl. 4 and 5. Fee, \$3.00. First semester.

Speech 62. Dramatics (3).

Continuation of Speech 61. Fee \$3.00. Second semester.

For Advanced Undergraduates and Graduates

Speech 160. Speech for the Teacher (3).

An orientation course in the field of speech for those engaged in classroom teaching or in directing extracurricular speech activities. Discussion as a teaching device; integration of speech with other subjects; recognition of common defects of speech; modern emphases in speech contests; individual investigations, reports, and conferences. Summer session.

Mr. Callaghan

Speech 161. Dramatics (3).

A practical course in production of plays; problems of designing of scenic effects, directing, and acting. Particular attention will be given to the difficulties encountered by those who teach dramatics. A production will be given by the class. Fee, \$5.00. Summer session.

Mr. Rights

JOURNALISM

ASSOCIATE PROFESSOR GRAMLEY
MESSRS. KOST AND MORAVEC

Students majoring in journalism take Journ. 11, 12, 13, 15, 16, 20. They must also complete four semesters of Journ. 1-8. Other requirements include twelve hours to be chosen from the following courses: Engl. 4, 5, 6, 7, 8, 9, 123, and 124, or in such equivalents as may be allowed; and also Hist. 25 and 26 or 129 and 130, Govt. 51 and 52, Eco. 3 and 4, Soc. 161 and 162, and

one of the following: Govt. 157 and 158, Eco. 133 and 134, Eco. 11 and 113. During the junior or senior year a field trip to New York is taken to visit metropolitan newspaper plants, and the headquarters of press associations, feature syndicates, photo services, etc. In alternate years the trip is taken to Washington, D. C. The comprehensive examination in journalism includes the content of courses studied in the sophomore, junior, and senior years.

Journ. 1-8. Brown and White (1).

Enrollment constitutes membership on the staff of the semi-weekly paper. All composition work is for publication. Students enrolling for their first semester sign for Journ. 1; for their second semester, Journ. 2; etc. By faculty action this course may be elected each semester for credit in addition to other courses on a student's roster. Students also enroll in Journ. 1-8 for the business staff of the paper. Fee, \$1.00. First and second semesters.

Journ. 11. Newspaper Reporting and Writing (3).

A beginning course in newspaper journalism. Definition of news; news values and reader interest; structure of the news story; newspaper English; how to report and write simple news stories. Prerequisites: Eng. 1 and 2. Fee, \$2.00. First semester.

Journ. 12. Advanced Newspaper Reporting and Writing (3).

Continuation of Journ. 11. A course in the reporting and writing of particular types of news. Special attention is paid to news of public affairs. Fee, \$2.00. Second semester.

Journ. 13. Newspaper Editing and Copy Reading (3).

Study and practice of the technique of the newspaper copy reader and news editor; headline writing and make-up. Prerequisites: Journ. 11 and 12. Fee, \$1.50. First semester.

Journ. 15. Editorial Writing and Modern Problems (3).

The content and technique of the editorial. Discussion of modern problems and review of individual prejudices as preliminary to writing of editorials on contemporary events. Prerequisite: junior standing. Not given in 1941-42. First semester.

Journ. 16. Newspaper Problems and Policies (3).

A study of the ethical principles of newspaper publishing. "To print or not to print," sensational or "yellow" journalism; tabloids; faking; ghost writing; crusades. Study of the law of libel and of postal regulation governing newspapers. Prerequisite: junior standing. Not given in 1941-42. Second semester.

Journ. 17. Feature and Magazine Writing (3).

Writing all kinds of feature articles from newspaper "brighteners" to essays of opinion, personality, sketches, etc., of magazine length. A

different current magazine is studied each week as a model. Prerequisites: Engl. 1 and 2. Fee, \$1.50. First semester.

Journ. 18. History of American Journalism (3).

English background of American newspaper; development of press from colonial days to the present; influence of newspaper on American life; contributions of outstanding journalists. Prerequisite: junior standing. Second semester.

Journ. 20. Journalism Proseminar (3).

Required of students of senior standing who are majoring in journalism. Survey of the newspaper field in its relation to public affairs. Extensive reading in books, magazines, and newspapers. Second semester.

Journ. 43. Writing For Business.

Study and practice in writing business news stories, direct mail material, and reports which the business man must prepare; the employee magazine; preparation of semi-popular articles. Prerequisites: Engl. 1 and 2. First and second semesters.

For Advanced Undergraduates and Graduates

Journ. 101. Modern Newspaper Practice (3).

A practical course dealing primarily with the methods of securing, writing, and editing news. The evaluation and organization of materials; practice in the preparation of news for publication. Study of news sources and values and reader interest. The place of the press in modern society. The difficulties encountered by faculty advisers of secondary school publications; individual conferences with such advisers. Summer session.

Mr. Gramley

FINANCE

PROFESSOR BRADFORD, ASSOCIATE PROFESSOR BISHOP
ASSISTANT PROFESSOR MAYER

Fin. 21. Corporation Finance (3).

The methods of corporations in obtaining capital, issuing securities, and extinguishing debts, the rights and obligations of security holders and problems of corporation insolvency and dissolution. Prerequisite: *Eco. 4*. First semester.

Fin. 22. Corporation Finance (3).

Continuation of *Fin. 21*. Prerequisites: *Eco. 4*; *Fin. 21*. Second semester.

Fin. 25. Corporation Finance (3).

An intensive course covering the fundamentals of corporation finance in one semester. Especially designed for engineering students. Prerequisite: *Eco. 4*. First semester.

Fin. 29. Money and Banking (3).

The nature of money and the principles of banking; coinage systems, monetary standards, paper currency, the economic functions of banks,

bank-note issue, various banking systems, and the Federal Reserve system. Prerequisite: *Eco. 4*. First semester.

Fin. 30. Money and Banking (3).

Continuation of *Fin. 29*. Prerequisites: *Eco. 4*; *Fin. 29*. Second semester.

For Advanced Undergraduates and Graduates

Fin. 123. Investments (3).

A one-semester course which makes a detailed study, from the standpoint of the investor, of the various types of corporation and government securities, with special reference to owners' equities, comparative yields and the machinery of investment, including stock exchange operations. Prerequisite: *Fin. 22 or 25*. First semester. Mr. Bishop

Fin. 124. Investments (3).

A project course in investment analysis for advanced students who are already familiar with investment principles. Sources of data and analysis procedures; the securities of railroads, public utilities, and municipalities. Prerequisite: *consent of the head of the department*. Second semester.

Mr. Bishop

Fin. 126. Public Finance (3).

A one-semester course dealing with government expenditures and revenues, public debts and taxation, with emphasis on the economics and the administration of federal and state taxes. Prerequisite: *Eco. 4*. Second semester. Mr. Bishop

Fin. 131. Foreign Trade and Exchange (3).

A one-semester course on the theory and practice of foreign exchange, dealing with the relation between currencies of different countries, monetary standards, gold movements, and the financing of international transactions. Prerequisite: *Fin. 30*. First semester. Mr. Bradford

Fin. 132. Banking and Credit Policies (3).

The policies of the Federal Reserve system with particular reference to the control of credit by the Reserve authorities. Prerequisite: *Fin. 30*. Second semester. Mr. Bradford

Fin. 135. Transportation (3).

The economics of transportation by rail, highway, water, pipeline, and air. Effects of transport costs on prices and on location of industries and markets, rate theory and practice, regulation, finance, government ownership, and coordination. Prerequisite: *Eco. 4*. First semester. Mr. Mayer

Fin. 136. Public Utilities (3).

Rate making, finance, combination, public ownership, federal power policy, and related problems in the electric, gas, and telephone industries. Prerequisite: *Eco. 4*. Second semester. Mr. Mayer

Fin. 171. Readings in Finance (3).

A course of readings in various fields of finance, designed for the student who has a special interest in some field of finance not covered by

the regularly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Mr. Bradford

Fin. 172. Readings in Finance (3).

Continuation of Fin. 171. Prerequisites: senior standing and consent of the head of the department. Second semester. Mr. Bradford

FINE ARTS

ASSOCIATE PROFESSOR HOWLAND

F.A. 3. History of Architecture (3).

The development of architecture from its beginning in Egypt and Mesopotamia, through Greece and Rome, the Early Christian period, and the Romanesque; and briefly the architecture of the Orient. First semester.

F.A. 4. History of Architecture (3).

Continuation of F.A. 3. The development of Gothic architecture, the Renaissance, and successive movements down to and including the present day. Second semester.

F.A. 5. Freehand Drawing (3).

Elementary freehand perspective, followed by drawing from still life objects and casts in pencil, charcoal, and in the various modes; delineation, form-drawing, color value. First semester.

F.A. 6. Freehand Drawing (3).

Further practice in expression; color theory with simple exercises in water colors or oils. Second semester.

F.A. 11. Ancient and Medieval Art (3).

An approach to the understanding and enjoyment of the arts. The development of art is traced through the ancient and medieval periods. The relation between artistic expression and the age which produced it. Lectures. Open to freshmen. First semester.

F.A. 12. The Art of the Italian Renaissance (3).

Painting, sculpture, and architecture are examined as the outgrowth of conditions in Italy during the fourteenth, fifteenth, and sixteenth centuries; the influence of medieval thought and tradition, the awakening interest in nature, the effect of antiquity, especially the stimulus it gave to individual effort. Lectures. Open to freshmen. Second semester.

F.A. 13. The Art of the Northern Renaissance (3).

Art in Europe other than Italy from the fifteenth century to the French Revolution. Contrasts between native tendencies and foreign influences, especially those of the Italian Renaissance, with the resulting struggle between idealism and realism. Lectures. Prerequisite: F.A. 12. Not given in even-numbered years. First semester.

F.A. 14. Modern Art (3).

The nineteenth and twentieth centuries. The historical relationships, the underlying theories, and the influence of contemporary thought as aids in understanding modern art. The treatment includes Classicism, Romanticism, Impressionism, and the various modern schools. Prerequisite: F.A. 11 or 12. Not given in odd-numbered years. Second semester.

F.A. 17. Criticism and Analysis of Art (3).

A critical analysis of the divergent views of the nature of art, its origin and intention. The ancient writers are consulted for views held in Greece and Rome. Factors in molding art opinion in the Middle Ages. Changes in the Renaissance. Primarily for majors. Prerequisites: F.A. 11 and 12, or suitable preparation in the history of fine arts, and consent of the head of the department. Not given in odd-numbered years. First semester.

F.A. 18. Criticism and Analysis of Art (3).

Continuation of F.A. 17 with special attention to art criticism since the 17th century. Prerequisite: same as for F.A. 17. Not given in even-numbered years. Second semester.

F.A. 19. Prints and Print Processes (3).

History and methods of making wood-cuts, engravings, etchings, aquatints, mezzotints, lithographs. Laboratory experiments when practicable. Prerequisite: consent of the instructor. Offered only in even-numbered years when there is no demand for F.A. 17 and 18. Second semester.

F.A. 25. Principles and Practices of Landscape Painting (3).

Oil painting based upon the principles which underlie the treatment of landscape. The greater portion of the time is devoted to actual painting from nature, in accordance with the methods and theories employed by artists of various schools. Weekly lectures, illustrated by lantern slides and color-reproductions, on composition, technique, color, light, plastic and spatial effects, mood. Prerequisite: consent of the head of the department. Summer session.

FRENCH

See Romance Languages

GEOLOGY

PROFESSORS WILLARD AND B. L. MILLER
ASSOCIATE PROFESSORS FRETZ, WHITCOMB, AND FRASER
ASSISTANT PROFESSOR BUTLER

Geol. 1. Mineralogy (3).

The principles of crystallography with practice in determination of forms of models and crystals; the physical properties, origin, occurrence, association, and alteration of minerals; a study of about one hundred twenty of the common mineral species and varieties, with practice in identification based on physical properties and blowpipe analysis. Stu-

dents should have had Chem. 1 or 2, and 11 or 12, or 3 and 13 or 14. Fee, \$5.00. First semester.

Geol. 2. Engineering Mineralogy (2).

Elementary crystallography and the occurrence and properties of the common minerals. Elements of crystal structure, and physical and chemical properties of crystals. Students should have had Chem. 1 and 11 or 12; or 3 and 13 or 14. Planned for the metallurgical engineering curriculum and for students in chemistry and physics. Fee, \$5.00. First semester.

Geol. 5. Petrology (3).

Macroscopic study of igneous, sedimentary, and metamorphic rocks; their origin, classification, and identification. Prerequisite: Geol. 1 or 2. Second semester.

Geol. 8. Historical Geology (3).

The development of the continents and life forms; evolution based on the remains of animal and plant life preserved in the rocks. Text book, lectures, and laboratory exercises. Prerequisite: Geol. 10, or 16 and 17. Second semester.

Geol. 9. Engineering Geology (3).

Designed primarily for engineering students. Selected minerals, rocks, building stones, and road materials. Applications of geology to the construction of dams, tunnels, building foundations, and highways, and to the problems of underground water conditions, flood control, etc. Two lectures and one laboratory per week. Prerequisite: Geol. 10. Second semester.

Geol. 10. Principles of Geology (3).

An introductory survey of geologic processes. Lectures, field trips, laboratory exercises on common minerals, rocks, ores, fossils, and the study of topographic maps. Fee, \$1.00. First and second semesters.

Geol. 16. Physiography (3).

The origin, history, and economic significance of topographic features, soils and natural resources; occasional field trips and laboratory work devoted to instruction and practice in the interpretation and construction of topographic maps. First semester.

Geol. 17. Physiography (3).

Continuation of Geol. 16. Meteorology, climatology, oceanography, and geographical location. Factors constituting the natural environment in their effect upon man. Laboratory and field exercises. Prerequisite: Geol. 16. Second semester.

Geol. 18. Meteorology and Climatology (3).

The atmosphere and its work; investigations of climate. One laboratory period each week is devoted to meteorological instruments, preparation, and interpretation of weather maps and other meteorological data, and making forecasts. Second semester.

For Advanced Undergraduates and Graduates

Geol. 101. Applied Mineralogy Laboratory (1).

Preparation of polished surfaces of metallic ores and mill products. Identification of minerals by reflecting microscope and etching methods. Interpretation of textures and structures of ores with special reference to origin. Relation of textures and structures to ore dressing processes and concentration problems. For students interested in study of metallic ores and their concentration. Prerequisite: Geol. 108 (may be taken concurrently). Second semester. Mr. Butler

Geol. 107. Non-metallic Economic Geology (2).

The origin, modes of occurrence, properties, sources, production, and uses of non-metallic mineral products exclusive of the mineral fuels. Prerequisites: Geol. 5, and 10 or 16 and 17. First semester. Mr. Miller

Geol. 108. Metallic Economic Geology (3).

The geological occurrence, origin, distribution, uses, and commercial production of metalliferous minerals; consideration of the most important mining districts. Recitations, illustrated lectures, field trips, and laboratory examination of ore specimens from representative districts; visits to the zinc mines of Franklin Furnace, N. J., the magnetite mines of Dover, N. J., and Cornwall, Pa. Prerequisites: Geol. 1 and 10. Second semester. Mr. Fraser

Geol. 109. Paleontology (3).

Plant and animal fossils from the morphologic point of view; their use in interpreting geologic history; evolution of the faunas and floras. Lectures and laboratory work. Prerequisites: Geol. 10, or 16 and 17; or Biol. 1, 10 or 7 and 8. First semester. Mr. Whitcomb

Geol. 110. Stratigraphy and Sedimentation (3).

The origin, history, sequence, and correlation of bedded rocks, their faunas, ages, distribution, and structures. Lectures, laboratory, and field trips. Prerequisites: *Geol. 10, or 16 and 17, 8*; Geol. 1, 5, 109. Second semester. Mr. Willard

Geol. 111. Field Geology (2).

Practice in mapping and field work. Each student is assigned a definite area and is required to prepare a report thereon with geologic map, structure section, and collection of a full set of specimens. Prerequisites: *Geol. 10, or 16 and 17, 1, 5, 8, 110, 114*; Geol. 107, 108, 109, 124. Fee, \$1.00. First semester. Mr. Willard

Geol. 114. Structural Geology (3).

The major and minor structures encountered in both the massive and the layered rocks of the earth's crust. Typical problems of the type encountered in geological, geophysical, and mining work are studied in the laboratory. Prerequisites: Geol. 10. First semester. Mr. Fraser

Geol. 116. Proseminar (1).

Investigations of current and classic geological literature. Assigned readings and reports. Participated in by members of the teaching staff and advanced students. First and second semesters.

Geol. 117. Geochemistry (2).

The chemical and physiochemical processes involved in the formation of minerals, precipitation of sediments, solidification of igneous rocks, ore deposition, metamorphism, weathering, and related problems involved in the origin and subsequent changes of the igneous and sedimentary rocks. Prerequisites: Geol. 5, and 10 or 16 and 17. First semester.

Mr. Fraser

Geol. 118. Geology of Mineral Fuels (3).

Origin and occurrence of coal, oil, gas, and other bitumens. Characteristics of domestic and foreign fields. Laboratory period devoted to discussion and solution of geological problems encountered. Prerequisite: Geol. 10, or Geol. 16 and Geol. 17, and Geol. 8. Second semester.

Mr. Butler

Geol. 123. Optical Crystallography (3).

The study of optical theory in reference to the petrographic microscope and the use of the microscope in the examination and identification of minerals and artificial crystalline materials. Prerequisite: Geol. 1 and 5. First semester.

Mr. Fraser

Geol. 124. Petrography (3).

The examination, description and classification of igneous, sedimentary and metamorphic rocks with the aid of the petrographic microscope. Prerequisite: *Geol. 1, 4, 5, and 123.* Second semester.

Mr. Fraser

Geol. 128. Crystal Structure (2).

Concept of symmetry from viewpoint of structural crystallography. Various types of structures and relations to physical and chemical properties. Application of theory of crystal structure to solid solution, exsolution, isomorphism, inversions, and polymorphism. Interpretation of crystal structure data. Assigned reading of literature. Designed for students in physics, chemistry, metallurgy, and geology who are interested in X-ray investigation and modern theory of atomic structure. Prerequisites: Geol. 1 or 2; Chem. 1 and 11; Math. 1, Phys. 22, or their equivalent. First semester.

Mr. Butler

Geol. 171. Geological Problems (1 to 4).

Special problems in field, laboratory, and library. Specific work is assigned in individual cases. Prerequisite: senior standing and completion of substantially all the "100" courses in geology. Prospective students for this course should consult the department head. First semester.

Messrs, Willard, Miller, Whitcomb, Fraser, Butler

Geol. 172. Geological Problems (1 to 4).

Similar to Geol. 171. Geol. 172 may be elected as a continuation of Geol. 171 or separately. Prerequisites as for Geol. 171. A maximum of 6 credit hours for Geol. 171 and 172 only may be counted. Prospective students should consult the department head. Second semester.

Messrs. Willard, Miller, Whitcomb, Fraser, Butler

Phys. 150 and 151, Geophysics, are given in cooperation with the department of geology.

For Graduates

Geol. 220. Geological Investigation (1 to 6).

The investigation of special problems. Field, laboratory, library work on some limited area; presentation of a report thereon. Prospective students should consult the department head. Geol. 220 may be elected separately from Geol. 221. First semester.

Messrs. Willard, Miller, Whitcomb, Fraser, Butler

Geol. 221. Geological Investigation (1 to 6).

Similar to Geol. 220. May be elected as a continuation of Geol. 220 or separately. Prospective students should consult the department head.

Messrs. Willard, Miller, Whitcomb, Fraser, Butler

Geol. 222. Advanced Economic Geology (3 to 6).

Advanced work in ore deposits. Theories of ore deposition, together with detailed work on the type occurrences of some of the metallic or non-metallic minerals; thorough investigation and report on some mining district with special regard to the origin of the ores and such commercial aspects of the deposits as may depend chiefly on the geology; preparation and microscopic study of specimens of ores. Prerequisites: Geol. 107, 108. First semester.

Messrs. Miller, Fraser, Butler

Geol. 223. Advanced Economic Geology (3 to 6).

Continuation of Geol. 222. Second semester.

Messrs. Miller, Fraser, Butler

Geol. 225. Advanced Physiography (4).

The detailed study of physiographic types and processes. Conferences, reports, and thesis, with work in the laboratory and field. Prerequisite: training in elementary physiography and general geology. First semester.

Mr. Whitcomb

Geol. 227. Physical Crystallography (2).

An advanced course in the geometrical and physical properties of crystals with special reference to the Goldschmidt method of crystal measurement and projection. Prerequisites: Geol. 1, Phys. 24. Second semester.

Mr. Butler

Geol. 229. Coal Research (3).

The constitution of coal, embracing the preparation and microscopical examination of thin sections and polished surfaces and including a review of the literature describing other investigations. First and second semesters.
Messrs. Miller, Fraser

Geol. 230. Advanced Paleontology (3).

A detailed study of selected groups of fossils, generic and specific differences, identification, description, and preparation of fossils. First semester.
Messrs. Willard, Whitcomb

Geol. 231. Advanced Historical Geology (4).

An advanced course dealing with the problems of historical and stratigraphic geology. Reading and conferences. Second semester.
Messrs. Willard, Whitcomb

GERMAN

PROFESSOR PALMER, ASSOCIATE PROFESSOR MORE
ASSISTANT PROFESSOR TREMPER

Ger. 1. Elementary German (3).

First semester.

Ger. 2. Elementary German (3).

Continuation of Ger. 1. Prerequisite: *Ger. 1 or the equivalent*. Second semester.

Ger. 3. Intermediate German (3).

German prose and poetry. Outside reading. Composition. Prerequisite: *one year of college German or entrance German A*. First semester.

Ger. 4. Intermediate German (3).

Continuation of Ger. 3. Prerequisite: *Ger. 3 or the equivalent*. Second semester.

Ger. 7. German of Chemistry (3).

Rapid reading of selected texts on chemistry. Prerequisite: *one year of college German or entrance German A*. First or second semester.

Ger. 9. Advanced German, Prose and Poetry (3).

Rapid reading of representative texts; collateral reading. Prerequisite: *two years of college German or entrance German B*. First semester.

Ger. 10. Goethe's Faust (3).

Study of Part 1. Lectures on the origin and development of the Faust story; collateral reading. Prerequisite: *Ger. 9 or high standing in Ger. 3, 4, or 7*. Second semester.

Ger. 22. Conversation and Composition (3).

Review of German grammar. German composition, and conversation. Prerequisite: *Ger. 10 or high standing in Ger. 3, 4, or 7*. Second semester.

For Advanced Undergraduates and Graduates

Ger. 111. Nineteenth Century German Drama (3).

Lectures, reading, reports on assigned work. Prerequisite: *Ger. 10 or the equivalent*. First semester. Messrs. Palmer, More

Ger. 112. Nineteenth Century German Drama (3).

Continuation of Ger. 111. Prerequisite: *Ger. 10 or the equivalent*. Second semester. Messrs. Palmer, More

Ger. 113. Lessing, Goethe, and Schiller (3).

Prerequisite: *Ger. 10 or the equivalent*. Not given in 1941-42. First semester. Mr. Palmer

Ger. 114. Lessing, Goethe, and Schiller (3).

Continuation of Ger. 113. Prerequisite: *Ger. 10 or the equivalent*. Not given in 1941-42. Second semester. Mr. Palmer

Ger. 115. The German Short Story (3).

Origin and development. Rapid reading of illustrative stories, with particular attention to Gottfried Keller, Theodor Storm, C. F. Meyer, and Paul Heyse; lectures and reports. Prerequisite: *Ger. 10 or the equivalent*. First semester.

Ger. 116. The German Short Story (3).

Continuation of Ger. 115. Prerequisite: *Ger. 10 or the equivalent*. Second semester.

GOVERNMENT

See History and Government

GREEK

ASSOCIATE PROFESSOR CRUM

Gk. 1. Elementary Greek (3).

For all students who desire to obtain a fundamental knowledge of the Greek language. Early in the semester there will be reading in stories and legends in easy Greek. First semester.

Gk. 2. Elementary Greek (3).

Continued work in Greek vocabulary, forms, and syntax. Selections from Xenophon's *Anabasis*. Second semester.

Gk. 3. Second-Year Greek (3).

Anabasis; *Iliad* (if time permits); grammar and simple composition. (Offered only when Gk. 1 and 2 have been given in the preceding year). Prerequisites: Gk. 1 and 2, or one year of entrance Greek. First semester.

Gk. 4. Second-Year Greek (3).

Continuation of Gk. 3. Second semester.

Gk. 7. Thucydides (3).

One or more books. Composition. Prerequisites: Gk. 15 and 16. First semester.

Gk. 8. Tragedy (3).

Euripides, *Medea*, *Bacchae*, or another play. Sophocles, *Oedipus Tyrannus*, *Antigone*, or another. Literary study of the drama; poetical language, style, and conception; metrical reading; composition. Prerequisites: Gk. 15 and 16. Second semester.

Gk. 9. Dramatic Poetry (3).

Aeschylus, *Agamemnon* or *Prometheus Bound*. Aristophanes, *Clouds*, *Frogs*, or *Birds*. Aristophanes as humorist and as moralist, with consideration of the tendencies which he satirized. Meters. Elementary text-criticism. Prerequisites: Gk. 8, 15, and 16. Not given in 1940-41. First semester.

Gk. 10. Greek Oratory (3).

Selections from the earlier Attic orators and Desmosthenes. Rapid reading, the student being supposed to have reasonable facility in understanding the Greek directly without rendering into English. Attention is directed largely to those points which illustrate the development of Greek prose style. Prerequisites: Gk. 15 and 16. Second semester.

Gk. 11. Homer (3).

Rapid reading of considerable portions of the *Iliad* or the *Odyssey*. Homeric language, syntax, and meter reviewed with some reference to the needs of intending teachers, but chiefly as a foundation for the study outlined in Gk. 12. Prerequisites: Gk. 15 and 16. Not given in 1940-41. First semester.

Gk. 12. Lyric Poetry (3).

Fragments of the Elegiac, Iambic, and Melic poets; selections from Pindar or Theocritus. Prerequisites: Gk. 11, 15, and 16. Not given in 1940-41. Second semester.

Gk. 13. Hellenistic Greek (3).

New Testament. Selections from Lucian. To be submitted on occasion for Gk. 12. Prerequisites: Gk. 15 and 16, and the approval of the professor. Not given in 1940-41. Second semester.

Gk. 15. Homer and Herodotus (3).

Iliad, I-III. or selected books of the *Odyssey*. Herodotus,—selections. Study of the forms and syntax of the Homeric and Ionic dialects; grammatical analysis; reading aloud of Greek; sight-reading; composition. Prerequisites: Gk. 1, 2, 3, and 4, or entrance Greek. Not given in 1940-41. First semester.

Gk. 16. Plato (3).

Euthyphro, *Apology*, or other shorter dialogues. Grammar and composition as in the first semester. Prerequisite: Gk. 15. Second semester.

Courses Gk. 9 and 11, 10 and 12 (or 13) are offered in alternate years, and are open to both juniors and seniors.

Gk. 83. The Economic and Social Life of the Greeks (3).

A study of the activities of the Greeks with special reference to domestic arts, religion, athletics, warfare, medicine, education, social customs and commerce. Numismatics and vase painting. Lectures, collateral readings, and reports. Prerequisite: *consent of the instructor*. Not given in 1940-41. First semester.

Gk. 99. Ancient Science (3).

A study of the architecture, mining, machinery, medicine, husbandry, etc. as developed by early peoples, especially by the Greeks and the Romans. A comprehensive view of the knowledge and use of natural resources. No knowledge of the Greek or Latin language is required. Second semester.

For Advanced Undergraduates and Graduates

Gk. 100. Greek Literature in English Translation (3).

The development of the major departments of Greek literature with required readings in English translations, with special attention to the epic, drama, and lyric poetry. First semester. Mr. Crum

Gk. 121. Alexander the Great and the History of the Hellenistic Period (3).

A study of the political and social conditions of the Hellenistic period and the Greek influence upon contemporary and later civilizations. Not given in 1940-41. First semester. Mr. Crum

Gk. 181. Greek Archaeology (3).

Aims and methods. A chronological presentation of prehistoric civilizations including the Neolithic, Minoan, Helladic, and Mycenaean periods. A study of extant ancient monuments, buildings, and city plans of important sites of the classical and hellenistic periods. Lectures, collateral readings, and reports. Prerequisite: *consent of the instructor*. First semester. Messrs. Crum, McDonald

For Graduates

Candidates must satisfy the head of the department as to their adequate preparation for advanced work. Ordinarily students will be expected to have had in their undergraduate work at least four years of work in Greek.

Gk. 201. Greek Poetry (3).

The development of poetry in Greece from Homer to the drama, with special study of the lyric poets, and collateral reading. Not given in 1940-41. First semester. Mr. Crum

HISTORY AND GOVERNMENT

Gk. 202. Greek Poetry (3).

Continuation of Gk. 201. Not given in 1940-41. Second semester.

Mr. Crum

Gk. 203. Greek Philosophy (3).

The history of philosophic thought in Greece, particularly in the pre-Socratic period, Ritter and Preller's *Historia Philosophiae Graecae*, and collateral reading. Not given in 1940-41. First semester.

Mr. Crum

Gk. 204. Greek Philosophy (3).

Continuation of Gk. 203. Not given in 1940-41. Second semester.

Mr. Crum

Gk. 205. Hellenistic Greek (3).

Portions of the *Gospels* in a comparative study, the *Acts*, and selected *Epistles*, Chapters from the *Septuagint*. Patristic literature. Collateral readings. Selections from Lucian. Not given in 1940-41. First semester.

Mr. Crum

Gk. 206. Hellenistic Greek (3).

Continuation of Gk. 205. Not given in 1940-41. Second semester.

Mr. Crum

HISTORY AND GOVERNMENT

PROFESSORS GIPSON AND BROWN

ASSOCIATE PROFESSORS HARMON, SCHULZ AND GODSHALL

HISTORY

Hist. 13. United States History (3).

The era of constitution-making; the evolution of political parties; foreign relations during the wars of the French revolutionary period; the western movement and western state-building; the growth of sectionalism. First semester.

Hist. 14. United States History (3).

The war for the Union; the reconstruction of the South; the era of big industry and labor combinations; the United States as a world power; the new national paternalism. Second semester.

Hist. 25. European History (3).

A rapid survey of the major historic forces from the collapse of the Roman Empire to the sixteenth century. The cultural aspects of medieval society. First semester.

Hist. 26. European History (3).

Continuation of Hist. 25. A detailed account of historic developments from the sixteenth to the nineteenth centuries with an attempt to set forth the important political antecedents of the World War. Second semester.

Hist. 27. European Expansion and Empire-Building, 1492-1700 (3).

Certain aspects of the phenomenon of the spread of European civilization and empire into the continents of America, Asia, and Africa. First semester.

Hist. 28. European Expansion and Empire-Building, 1700-1820 (3).

Continuation of Hist. 27. Second semester.

Hist. 31. English History to 1603 (3).

The history of England from its earliest known origins to the death of Queen Elizabeth. Not given in 1941-42. First semester.

Hist. 32. English History, 1603 to Date (3).

The history of England from the death of Queen Elizabeth to the present day. Not given in 1941-42. Second semester.

Attention is called also to the following courses in history offered by other departments: ANCIENT HISTORY, THE ROMAN REPUBLIC, and THE ROMAN EMPIRE, by the department of Latin; INDUSTRIAL EVOLUTION by the department of economics and sociology.

For Advanced Undergraduates and Graduates

Hist. 119. Proseminar (3).

Open to students of senior standing who desire to major in history or who have shown ability in humanistic studies. A brief period of history is studied intensively. The subject for 1940-41 is: The British Empire Before the American Revolution. First semester. Mr. Gipson

Hist. 120. Proseminar (3).

Continuation of Hist. 119. Second semester. Mr. Gipson

Hist. 122. England Under Elizabeth (3).

Queen Elizabeth and her contemporaries, with a discussion of social, political, and economic backgrounds. Prerequisite: *junior standing*. Not given in 1941. Summer session. Mr. Brown

Hist. 123. England and the Early Stuarts (3).

Constitutional and political development of the first half of the seventeenth century; a survey of social England. Prerequisite: *junior standing*. Not given in 1941. Summer session. Mr. Brown

Hist. 125. Social and Industrial England (3).

A study of the economic revolutions which took place in agriculture, gild production; and the search for markets during the 14th, 15th, and 16th centuries. Prerequisite: *junior standing*. First semester. Mr. Brown

Hist. 126. Social and Industrial England (3).

A continuation of Hist. 125; the growth of oversea trading companies, the Industrial Revolution, and the attempt made to meet the problems of social dislocation. Prerequisite: *junior standing*. Second semester.

Mr. Brown

Hist. 129. American Foreign Policy (3).

The French alliance; independence and boundaries; commercial restrictions; French Revolution and neutrality; purchase of Louisiana; War of 1812; acquisition of Florida; Monroe Doctrine; relations with France and Great Britain; Oregon and Texas; the Mexican War. Prerequisite: *junior standing*. First semester.

Mr. Harmon

Hist. 130. American Foreign Policy (3).

The Civil War and possible European intervention; Alaska boundary; War with Spain; the new Caribbean policies; the World War; the League of Nations; Washington Conference; the aftermath of the Great War. Prerequisite: *junior standing*. Second semester.

Mr. Harmon

Hist. 131. The Culture of the Middle Ages (3).

An attempt to appreciate the fusion of the Classical, Christian, and Teutonic elements which shaped the cultural life of the Middle Ages. The daily life and habits of men and women rather than political experience and military activity. Prerequisite: *junior standing*. Not given in 1941-42. First semester.

Mr. Brown

Hist. 132. The Culture of the Middle Ages (3).

Continuation of Hist. 131. An inquiry into feudal and peasant society; monasticism; industry and the guilds; art and architecture; amusements; food and clothing; poor and sick-relief; the theory and practice of Christianity. Prerequisite: *junior standing*. Not given in 1941-42. Second semester.

Mr. Brown

Hist. 133. The Culture of Modern Europe (3).

A study of the cultural phases of the fifteenth, sixteenth, and seventeenth centuries with emphasis upon the social life of the people. Prerequisite: *junior standing*. First semester.

Mr. Brown

Hist. 134. The Culture of Modern Europe (3).

Continuation of Hist. 133 but dealing with such cultural phenomena as the baroque, the rococo, and rationalism. The industrial revolution and the economic and social theories which accompanied it. Prerequisite: *junior standing*. Second semester.

Mr. Brown

Hist. 139. The Civil War (3).

Background of the Civil War; Buchanan's policy; Lincoln's attitude; views of Davis; northern and southern leaders contrasted. Prerequisite: *junior standing*. Not given in 1941-42. First semester.

Mr. Harmon

Hist. 140. Reconstruction of the Union (3).

Problems of a restored Union; the policy of Johnson; views of the North and South; radical reconstruction; the election of Grant; the

Supreme Court and reconstruction; the restoration of white supremacy in the South. Prerequisite: *junior standing*. Not given in 1941-42. Second semester. Mr. Harmon

Hist. 149. Hispanic America in the Nineteenth Century (3).

Successful movements for independence, recognition, types of governments formed in South, Central, and Caribbean America, wars and revolutions, problems pertinent to foreign trade, application of the Monroe Doctrine and its acceptance. Prerequisite: *junior standing*. First semester. Mr. Harmon

Hist. 150. Hispanic America in the Twentieth Century (3).

Continuation of Hist. 149. Results of the Spanish-American War, Theodore Roosevelt and "big stick" diplomacy, Panama Canal and world trade, debts and interventions. Pan-Americanism, World War and its influence, recent United States relations with Latin America. Prerequisite: *junior standing*. Second semester. Mr. Harmon

Hist. 160. History of American Political Parties (3).

Evolution of major and minor political parties, including the Federalist and Anti-Federalist, the Democratic and Republican, the Populist and Progressive. Party organization and functions; the economic and sectional basis of politics; nomination and election methods; the conduct of campaigns. Prerequisite: *junior standing*. Not given in 1941. Summer session. Mr. Harmon

Hist. 170. The World War and Its Aftermath (3).

The causes of the war, the chief areas of conflict, the causes for the collapse of the central powers, the peace of Versailles and the problems of world reconstruction. Prerequisite: *junior standing*. Summer session. Mr. Godshall

Hist. 175. Leading Figures in European History (3).

A series of biographical studies treating of men and women in church and state from Charlemagne to Napoleon. Emphasis is cultural rather than purely historical. Prerequisite: *junior standing*. Not given in 1941. Summer session. Mr. Brown

Hist. 179. The Far East Since 1800 (3).

A historical survey of the opening of China and Japan, the transformation of Japan, the partition of China, international rivalries in Korea, Manchuria, and the Philippines; economic and territorial imperialism, and Japanese quests for hegemony. Not given in 1941-42. First semester. Mr. Godshall

Hist. 180. Politics and Problems of the Far East (3).

An analysis of contemporary political and economic problems confronting not only the countries of the Orient but the Western Powers with interests in that region; boycotts; opium; currency and foreign exchange; transportation and communications; fishing and land rights; military, aerial, and naval strategy; the New Order in Asia. Not given in 1941-42. Second semester. Mr. Godshall

For Graduates

Students desiring to major in history and government should have had at least twelve semester hours in connection with their undergraduate work that bear upon this field of study or in other ways should satisfy the department that they are in a position to undertake profitably the required program for the master's degree. Students should register for graduate work only after consultation with the head of the department.

Hist. 201. English Institutional History (3).

Political, social, economic, and religious institutions which have most profoundly influenced American civilization. Not given in 1941-42. First semester. Mr. Brown

Hist. 202. English Institutional History (3).

Continuation of Hist. 201. Not given in 1941-42. Second semester. Mr. Brown

Hist. 203. England Under the Tudors (3).

An intensive study of England during the period 1485-1603. Special emphasis will be placed upon the social background. First semester. Mr. Brown

Hist. 204. England Under the Tudors (3).

A continuation of Hist. 203. Second semester. Mr. Brown

Hist. 205. England Under the Stuarts (3).

A study of the religious, political, and economic problems of the seventeenth century. Not given in 1941-42. First semester. Mr. Brown

Hist. 206. England Under the Stuarts (3).

A continuation of Hist. 205, but with particular stress upon social and literary activities. Not given in 1941-42. Second semester. Mr. Brown

Hist. 210. The British Commonwealth of Nations (3).

A survey of the British Empire during the nineteenth century, its metamorphosis into the Commonwealth of Nations, and an attempt to estimate its present significance. Not given in 1941. Summer session. Mr. Brown

Hist. 211. English Colonization in North America in the Seventeenth Century (3).

The activities of the great overseas trading companies; the problem of proprietorial control; the decline of the chartered colonies; conflicts between opposing political, economic, and religious ideals within the colonies. Not given in 1941-42. First semester. Mr. Gipson

Hist. 212. English Colonization in North America in the Seventeenth Century (3).

Continuation of Hist. 211. Not given in 1941-42. Second semester.

Mr. Gipson

Hist. 213. America in the Eighteenth Century (3).

The workings of the English mercantile system; the evolution of colonial institutions; the international struggle for the fur trade in North America; George III and the new administrative system. First semester.

Mr. Gipson

Hist. 214. America in the Eighteenth Century (3).

Continuation of Hist. 213. Second semester.

Mr. Gipson

Hist. 215. American Constitutional History (3).

The major problems involved in the growth of the powers of the national government. Not given in 1941-42. First semester. Mr. Harmon

Hist. 216. American Constitutional History (3).

Continuation of Hist. 215. Not given in 1941-42. Second semester.

Mr. Harmon

Hist. 217. America as a World Power (3).

The relations of the United States with Latin America; the problem of the Pacific; the United States and Europe. Not given in 1941. Summer session.

Mr. Harmon

Hist. 218. America as a World Power (3).

Continuation of Hist. 217. Not given in 1941. Summer session.

Mr. Harmon

Hist. 227. Research Methods in the Social Sciences (3).

Technique of research along the lines of historical method. Training in the critical handlings of documentary materials, in measuring the value of evidence, and in formal presentation of the results of research. Required of all graduate students in history and government. Open to seniors by permission. Not given in 1941-42. First semester.

Messrs. Gipson, Brown

Hist. 228. Research Methods in the Social Sciences (3).

Continuation of Hist. 227. Not given in 1941-42. Second semester.

Messrs. Gipson, Brown

Hist. 241. Pennsylvania History, 1683-1765 (3).

Various aspects of eighteenth century Pennsylvania history, such as the evolution of the institutions of government, the relations of the settlers to the proprietors, the land policy, the Indian policy, the relations of the various racial groups and religious groups toward one another and toward the provincial government, the relations of Pennsylvania and her colonial neighbors. Not given in 1941. Summer session.

Mr. Gipson

Hist. 242. Pennsylvania History, 1765-1787 (3).

Revolutionary movement in provincial Pennsylvania; Pennsylvania at war; the fate of the Pennsylvania loyalists; experiments in constitution-making. Summer session. Mr. Gipson

Hist. 243. Pennsylvania History, 1787-1860 (3).

Constitutional, political, economic, and social aspects of the history of the commonwealth within the new Federal Union. Not given in 1941. Summer session. Mr. Gipson

GOVERNMENT

Govt. 1. The Foundations of Government (3).

A survey of the basic problems of governmental organization and operation with emphasis upon the controversial issues involved and the relevant political institutions and practices, both contemporary and past, of American, European, and Asiatic peoples. First and second semesters.

Govt. 51. Government of the United States (3).

The evolution of the Federal Government; constitutional principles; machinery of government; citizenship and immigration; emphasis upon the experiences of the American people in their dealings with government and upon the practical workings of that government. First semester.

Govt. 52. State Government in the United States (3).

The position of the states in the union; machinery and activities of state governments; individual rights; the police power; instruments of popular control; the various forms of local government. Second semester.

Govt. 61. Diplomacy (3).

Scrutiny of the methods and objectives of European diplomacy with particular emphasis upon illustrative documentary materials portraying negotiations and policies as actually pursued by statesmen striving for position and power. Prerequisite: sophomore standing. First semester.

Govt. 62. International Relations (3).

Attention is focused upon the historic national policies of the Great Powers which dominate international relations, with interpretation of these policies in the light of basic political, economic, technological, ethnic, geographic, and historic factors. Prerequisite: sophomore standing. Second semester.

Attention is called to the courses in ANCIENT HISTORY, ROMAN LAW and ROMAN POLITICAL INSTITUTIONS offered by the department of Latin.

For Advanced Undergraduates and Graduates

Govt. 151. The American Constitutional System (3).

The constitutional basis of American government with emphasis upon the principles of the federal system, the organization and powers of the

national government, and the relation of the government to the individual in such matters as the protection of persons accused of crime, the protection of contracts, and due process of law. Prerequisite: *junior standing*. Not given in 1941. Summer session. Mr. Schulz

Govt. 157. Municipal Government (3).

The machinery and processes of municipal government in the United States; city-state relations; the government of metropolitan areas; the forms of city government, proportional representation. Special emphasis upon the working of the council-manager plan. Prerequisite: *junior standing*. First semester. Mr. Schulz

Govt. 158. Municipal Administration (3).

Examination of the fundamental principles of effective administration; a survey of such municipal problems as city planning, health control, urban transportation, police and fire protection, water supply, and waste collection and disposal. Prerequisite: *junior standing*. Second semester. Mr. Schulz

Govt. 161. International Law (3).

Consideration of the rules governing the conduct of states in their relations with one another in time of peace. Prerequisite: *junior standing*. First semester. Mr. Godshall

Govt. 162. International Law (3).

Continuation of Govt. 161. The rules governing relations between states in the event of war. Prerequisite: *junior standing*. Second semester. Mr. Godshall

Govt. 163. Contemporary Political Thought (3).

Analysis of the basic concepts of political science; state, government, sovereignty, law, liberty, rights; consideration of authoritarian and popular government; presidential and parliamentary systems. Prerequisite: *junior standing*. First semester. Mr. Schulz

Govt. 164. Contemporary Political Thought (3).

Theories concerning the proper role of the State in society and the ethical justification of political coercion; the political aspects of anarchism, communism, socialism, fascism, and political pluralism. Prerequisite: *junior standing*. Second semester. Mr. Schulz

For Graduates

Govt. 263. Seminar in Political Theory (3).

Consideration of theories concerning the nature of the State, its origin, and its role in society. Prerequisites: Govt. 163, 164. Not given in 1941-42. First semester. Mr. Schulz

Govt. 264. Seminar in Political Theory (3).

A continuation of Govt. 263. Prerequisites: Govt. 162, 164, 263. Not given in 1941-42. Second semester. Mr. Schulz

INDUSTRIAL ENGINEERING

See Mechanical Engineering

ITALIAN

See Romance Languages

JOURNALISM

See English

LATIN

PROFESSOR WRIGHT, MR. McDONALD

Lat. 1a. Latin (3).

For freshmen who enter with four years of high school Latin. PLINY, selected letters. CICERO, selected letters. Development of letter writing among the Romans and its influence on modern literature. Prerequisite: four years of high school Latin. First semester.

Lat. 1b. Latin (3).

For freshmen who enter with three units of Latin. VERGIL. *Bucolics* and the *Aeneid* I-VI, or selections from OVID. Practice in reading aloud and scansion; training in sight translation; the mythology and religion of Greece and Rome; the influence of Latin poetry upon English literature. Prerequisite: three units of high school Latin. First semester.

Lat. 2. Horace (3).

Selected Odes. Lectures on the history and development of lyric poetry; constant practice in reading the more important lyric meters; memorizing of stanzas and passages. Prerequisite: Lat. 1a or 1b. Second semester.

Lat. 4. Livy (3).

Selections from earlier books. Some study of early Roman history and topography. CATULLUS, selected poems. Prerequisites Lat. 1 and 2. First or second semester.

Lat. 11. English Words Derived from the Latin (3).

Intended to give the students some familiarity with those Latin words that have contributed most largely in derivatives to the English language and to teach the intelligent use of the English dictionary. Elective for all students; no previous knowledge of Latin required. Not given in 1940-41 First semester

Lat. 13. Latin Drama (3).

Drama among the Romans; native dramatic performances; indebtedness to Greek drama; the various dramatic forms and their vogue; chief writers; dramatic festivals; the Roman theater; influences in later literature. Reading of selected plays of Plautus, Terence, and Seneca. Prerequisite: Lat. 2 First or second semester.

Lat. 21. Ancient History (3).

The development of civilization from Paleolithic times to the world empire of Alexander the Great. The first six weeks are assigned to the Stone Age, the Oriental nations, and the Minoan civilization; the remainder of the semester to Hellenic Greece. Political history; the social, economic, religious, philosophic, artistic, and literary development of the ancient world; the origin of political institutions. First semester.

Lat. 22. Ancient History (3).

Continuation of Lat. 21. The Hellenistic Age. Rome from its origin to 395 A.D. Second semester.

Lat. 23. Roman Law (3).

Preliminary lectures on laws and customs of peoples anterior to the rise of Roman law. The development of Roman law from the *Leges Regiae* to the codification of Justinian. The influence of Roman law on modern nations. Reading of select portions of the law, comparing them with modern law. Prerequisite: sophomore standing. Not given in 1940-41. First or second semester.

Lat. 24. Roman Political Institutions (3).

The political institutions established and developed at Rome from the earliest times to the reign of Diocletian. A description and historical survey of political life at Rome and in its provinces by means of lectures, assigned readings, and special reports. Consideration of the titles and duties of state officials during the regal period, the republic, and the empire. Prerequisite: sophomore standing. Not given in 1940-41. First or second semester.

Lat. 31. Beginning Latin (3).

Special emphasis on English derivations and the principles of grammar. First semester.

Lat. 32. Cæsar (3).

The Gallic War. Books I-IV. Prose composition and syntax. Second semester.

Lat. 33. Cæsar (3).

Selections from the later books of the *Gallic War* or from the *Civil War*. Prose composition and syntax, with emphasis on clause construction. For students who enter with two years of Latin and who elect to continue Latin. Prerequisite: two years of high school Latin. Not given in 1940-41. First semester.

Lat. 34. Cicero (3).

Orations. Continuation of Lat. 33. Essays: *de Senectute* or *de Amicitia*. Prerequisite: Lat. 33. Not given in 1940-41. Second semester.

Lat. 84. The Economic and Social Life of the Romans (3).

A general survey of Roman life under the following headings: commerce, trade, industrial and domestic arts, agriculture, religion, athletics,

amusements, warfare, medicine and surgery, education, marriage and funeral customs, costume, houses, and furniture. Lectures, collateral readings and report. Prerequisite: *consent of the instructor* Not given in 1940-41. Second semester.

For Advanced Undergraduates and Graduates

Lat. 105. Satire (3).

Selected satires of Horace and Juvenal. Lectures on the history of Roman satire and its influence on modern literature. Study of social conditions under the empire. Prerequisites: Lat. 13 and 4. First semester.
Mr. Wright

Lat. 106. Roman Prose Writers of the Empire (3).

Selections from the following: Petronius, *Cena Trimalchionis*; Apulius, Cupid and Psyche story from the *Metamorphoses*; Suetonius, *Lives*; Seneca, *Moral Epistles* and *Dialogues*; Tacitus, *Germania*. Prerequisites: Lat. 13 and 4. Second semester.
Mr. McDonald

Lat. 107. Vergil (3).

Aeneid, Books VII-XII. Continuation of Lat. 108. Prerequisites: Lat. 13 and 4. Not given in 1940-41. First semester.
Mr. Wright

Lat. 108. Lucretius (3).

The finest literary passages and selected passages illustrating his philosophy. ENNIUS and some study of early Roman epic. VERGIL's sixth *Aeneid*. An intensive study of its debt to Greek literature, religion, and philosophy, and its influence on modern literature. Lectures on the history of the epic; collateral reading in the great epics of other literatures. Prerequisites: Lat. 13 and 4. Not given in 1940-41. Second semester.

Mr. Wright

Lat. 109. Latin Prose Composition (3).

Exercises in translating from English into Latin with a collateral study of Latin grammar. Special attention to clause construction and other points of syntax. Students preparing to teach Latin are expected to elect this course. Prerequisites: Lat. 13 and 4. First or second semester.

Mr. McDonald

Lat. 110. The Teaching of High School Latin (3).

Discussion of aims, content, and methods, and of the standard texts used in preparatory school Latin, with a consideration of the report of the Classical Investigation, of Lodge's *Vocabulary of High School Latin*, and of Byrne's *Syntax of High School Latin*. Students preparing to teach Latin are expected to elect this course. Prerequisites: Lat. 4 and 13. Not given in 1940-41. First or second semester.

Mr. McDonald

Lat. 121. The Roman Republic (3).

Special emphasis on governmental and social problems of the last two centuries B. C. and the Hellenistic Greek background of the Roman Empire. Prerequisites: Lat. 21 and 22. Not given in 1940-41. First or second semester.

Mr. McDonald

Lat. 122. The Roman Empire to the Death of Marcus Aurelius (3).

Special emphasis upon the development of the principate, and upon the social and economic structure of Rome, the provinces, and the municipalities. Prerequisites: Lat 21, 22, and 121. Not given in 1940-41. Second semester. Mr. McDonald

Lat. 125. Latin Literature in English Translation (3).

A study of Latin literature by means of the best English translations. No knowledge of the Latin language is required. The lives of the most important authors are studied and their works read according to the major departments of literature,—history, comedy, epic, lyric, etc. Emphasis is placed on the chronological development of the literature and historical background necessary to the interpretation of the author's works. Lectures and readings with special reports. Prerequisite: junior standing. Not given in 1940-41. Second semester. Mr. McDonald

Lat. 182. Archaeology of Italy (3).

Neolithic, Terramare, Villanovan, and Etruscan cultures. Rome the City: its buildings, monuments, and streets, its destruction and rediscovery through excavation; origin and growth of the city; the three periods, empire, republic, and kingdom; methods of identifying and dating monuments. A survey of Pompeii, Herculaneum and Ostia. Lectures, readings, and reports. Prerequisite: *consent of the instructor*. Second semester.

Messrs. Wright and McDonald

For Graduates

For admission to graduate courses the student must satisfy the department of his fitness and adequate preparation. It is generally preferred that applicants have completed twenty-four semester hours of undergraduate college Latin in an approved college or university.

Lat. 201. Latin Epigraphy (3).

Text book supplemented by frequent use of the *Corpus Inscriptionum Latinarum* and the standard texts of some of the longer inscriptions, illustrating Roman political institutions, public and private life, and religion. Not given in 1940-41. First semester.

Messrs. Wright, McDonald

Lat. 202. Topography and Monuments of Ancient Rome (3).

Lectures (usually illustrated) on the origin, growth, and destruction of ancient Rome and on modern methods of identifying extant monuments. Frequent reports based on a detailed study of the discoveries affecting individual sites. Not given in 1940-41. First or second semester.

Mr. Wright

MATHEMATICS AND ASTRONOMY

Lat. 203. Ovid's *Fasti* (3).

Substantially the whole of the *Fasti*. Lectures on the religion of ancient Rome and numerous reports on the various festivals treated in Ovid's poem and its sources. Not given in 1940-41. First or second semester.

Mr. Wright

Lat. 205. Roman Epic (3).

Lectures on the history of epic poetry. Intensive study of the *Aeneid* of Vergil and its sources. Not given in 1940-41. First semester.

Mr. Wright

Lat. 207. Seminar (3).

Intensive study and reports on the text, history, and interpretation of some work chosen from one of the following authors Livy, Ovid, Horace, Vergil, Cicero, Celsus, Quintilian, and Pliny. Not given in 1940-41. First or second semester.

Messrs. Wright, McDonald

Lat. 208. Tacitus (3).

Readings of selections, especially for the *Annals*. The material on Tiberius and Nero will be particularly studied. Collateral work in Suetonius and Cassius Dio. A study of the comparative credibility of Tacitus, Suetonius, and Dio. Frequent reports by students. Not given in 1940-41. First or second semester.

Mr. McDonald

Lat. 209. Cicero's *Letters* (3).

Reading of a large selection of the letters of Cicero. Study of the political and social background of the period. The other works of Cicero will be used to illustrate the letters. Particular attention will be paid to material of value to teachers of Cicero in the secondary schools. Not given in 1940-41. First or second semester.

Mr. McDonald

LAW

See Accounting

MATHEMATICS AND ASTRONOMY

PROFESSORS FORT, REYNOLDS, AND SMAIL

ASSOCIATE PROFESSORS LAMSON, SHOOK, AND RAYNOR

ASSISTANT PROFESSORS BEALE, LATSHAW, PITCHER, AND CUTLER

MESSRS. VAN ARNAM, VANDERSLICE, M. F. SMILEY, PERKINS,

TRANSUE, PARK, AND BURTON

The undergraduate major in mathematics in the College of Arts and Science consists of at least thirty semester hours college credit in mathematics. It must include Math. 15 and Math. 106. The twelve hours advanced credit required by the regulations of the college must be from mathematics courses given at Lehigh University other than Math. 1, 1a, 1b, 11, 11a, 12, 13, 14, 15, 16, 20, 23, 24, and 40.

A major in actuarial science is offered within the department of mathematics. The graduate should be able to pass the examinations for associate in the Actuarial Society of America. The major consists of Math. 11, 12, 13, 14, 15, 40, 42, 43, 51, 124, 227, Acctg. 1, 2, Fin. 25, Eco. 3, 4, 107, and 108.

The department of mathematics accepts candidates for the degree of Doctor of Philosophy who wish to specialize in analysis, mechanics, or geometry. Persons who are interested should read the general regulations of the Graduate School and consult with the head of the department of mathematics.

To major in mathematics and obtain a master's degree in one year, a graduate student must present evidence of having completed the work required of an undergraduate who majors in mathematics in a Class A American college. Such a major is understood to include at least twelve semester hours of mathematics requiring as a prerequisite one year of calculus. Graduate students who cannot satisfy these requirements but who desire to major in mathematics may take preliminary courses for which they are prepared but cannot expect to complete the requirements for a master's degree in one year.

Math. 1. Plane Trigonometry (3).

First semester.

Math. 1a. Unified Mathematics (3).

This course is designed for freshmen in the College of Arts and Science, particularly those who do not desire to specialize in mathematics. First semester.

Math. 1b. General Mathematics for Students of Business (3).

Graphs and charts, the straight line law, the law of the parabola, logarithms, arithmetic and geometrical progressions, the exponential law, the power law, curve fitting, permutations, combinations, and probability. First and second semesters.

Math. 11. Algebra and Analytic Geometry (3).

Algebra review, theory of equations, approximate solutions of numerical equations; introduction to analytic geometry; differentiation of algebraic functions. Prerequisite Math. 1 or 1a, or entrance credit in plane trigonometry. First and second semesters.

Math. 11a. Solid Geometry and Analytic Geometry (3).

Essentials of solid geometry with emphasis on mensuration; introduction to analytic geometry; differentiation of algebraic functions. Prerequisite: Math. 1 or 1a, or entrance credit in plane trigonometry. First and second semesters.

Math. 12. Analytic Geometry and Calculus (3).

Conic sections and curve tracing; integration with simple applications. Prerequisite: Math. 11. First and second semesters.

Math. 13. Calculus (3).

Transcendental functions, polar coordinates, extensive drill in the technique of integration, applications. Prerequisite: Math. 12. First and second semesters.

Math. 14. Intermediate Calculus (3).

Partial derivatives; multiple integrals, centroids, monuments of inertia, etc.; Taylor's formula. Prerequisite: Math. 13. First and second semesters.

Math. 15. Reading Course in Mathematics (1).

Credit not to exceed one hour per semester, total credit not to exceed three hours; approval of program and written report required. Prerequisite: consent of the head of the department. First and second semesters.

Math. 16. Solid and Spherical Geometry and Spherical Trigonometry (3).

Open to all students, particularly advised for students of astronomy. Given when there is sufficient demand. First semester.

Math. 20. Elementary Mechanics (4).

Composition and resolution of forces, conditions of equilibrium for rigid bodies, friction, work, elementary kinematics, and kinetics. Prerequisite: Math. 1. First and second semesters.

Math. 23. General Mathematics for Students of Business, Second Course (3).

Fundamental ideas of analytic geometry and calculus, and selected topics of algebra, with numerous applications to problems of business and the social sciences generally. Prerequisite: Math. 1b. Second semester.

Math. 24. General Mathematics for Students of Business, Third Course (3).

Continuation of Math. 23. First semester.

Math. 40. Mathematics of Finance (3).

Compound interest, an elementary treatment of annuities, etc. Prerequisite: Math. 1a, 1b, or 11. First and second semesters.

Math. 42. Mathematics of Statistics (3).

Prerequisite: Math 11 or 40. Second semester.

Math. 43. First Course in Mathematics of Life Insurance (3).

Mathematical theory of life contingency; preparation of life and monetary tables; computation of premiums for various life insurance policies; valuation of policies to meet statutory requirements; mathematical theory of risk and cost of insurance; computation of items for annual reports; valuation of life annuities. Prerequisite: Math. 40. First semester.

Math. 51. Advanced Algebra (3).

Complex numbers, theory of equations with applications to classical problems, Sturm's theorem, etc., determinants, and the theory of resultants. Prerequisite: Math. 11. First semester.

Math. 54. Higher Geometry (3).

An introductory course in projective geometry and non-euclidean geometry. Prerequisite: *Math. 13, previously or concurrently*. Second semester.

For Advanced Undergraduates and Graduates

Math. 101. Vector Analysis (3).

The theory and methods of vector analysis as applied in physics and pure mathematics. Prerequisite: *Math. 106*. First semester. Mr. Latshaw

Math. 106. Advanced Calculus (3).

Line and surface integrals, elementary differential equations, complex variables, Fourier series, and other selected topics. Prerequisite: Math. 14. First and second semesters. Messrs. Fort, Smail

Math. 111. Differential Equations (3).

Special solvable non-linear equations, linear equations, transformations, and symbolic methods, solutions in series, Riccati's, Bessel's and Legendre's equations. Prerequisite: Math 106. First semester. Mr. Shook

Math. 112. Differential Equations and Harmonic Analysis (3).

Continuation of Math. 111. Partial differential equations. Fourier series, and cylindrical and spherical harmonics. Second semester. Mr. Shook

Math. 121. Analytic Mechanics (3).

Differential equations of motion, treatment of forces in space, free and constrained motion of a particle and of masses, with applications to practical problems. Prerequisite: Math. 106. First and second semesters. Mr. Reynolds

Math. 124. Theory of Errors and Least Squares, Empirical Formulas (3).

Probability, least squares and its application in the study of errors, the formation of empirical formulas. Designed for students engaged in experimental or observation work. Prerequisite: Math. 106. Second semester. Mr. Latshaw

Math. 125. Aerodynamics (3).

Fundamentals of fluid mechanics applied to wing and propeller theory. The Prandtl theory of lift and drag. Principles of similitude with applications to wind tunnel tests. Prerequisites: *Math. 14 and 20*. First semester. Mr. Shook

Math. 126. Aerodynamics (3).

Dynamics of the airplane. Climbing, gliding, and other types of flight. Theory of stability and control in preparation for work in design. Prerequisite: Math. 125. Second semester. Mr. Shook

Math. 128. Exterior Ballistics (3).

The trajectory; air resistance; drag and cross wind coefficients; yaw; stability; equations of motion; computation of trajectories; ballistic and firing tables; rotation of the earth; probability; probability integral; probability of hitting. Prerequisites: *Math. 106 or Math. 125*. Second semester. Mr. Raynor

Math. 140. Higher Algebra (3).

Linear dependence. Linear equations. Theory of matrices and linear transformation. Bilinear and quadratic forms. Theory of invariants. Second semester. Mr. Smiley

For Graduates

Math. 200. Fundamental Concepts of Mathematics (3).

Not given in 1941-42. First semester. Mr. Fort

Math. 209. Mathematics Seminar (3).

Reports on special topics of the literature of mathematics and of individual research. Prerequisite: graduate standing and consent of the instructor. Given when there is sufficient demand. First semester.

Messrs. Fort, Reynolds, Smail, Raynor

Math. 210. Mathematics Seminar (3).

Continuation of Math. 209. Second semester.

Messrs. Fort, Reynolds, Smail, Raynor

Math. 211. Infinite Processes (3).

Fundamental limit notions applied to various infinite processes. Not given in 1941-42. First semester. Mr. Fort

Math. 212. Infinite Processes (3).

Continuation of Math. 211. Not given in 1941-42. Second semester. Mr. Fort

Math. 215. Theory of Functions of a Complex Variable (3).

First semester. Mr. Smail

Math. 216. Theory of Functions of a Complex Variable (3).

Continuation of Math. 215. Second semester. Mr. Smail

Math. 217. Theory of Elasticity (3).

Theory of stress and strain. Tension and thrust with applications. Bending of rods and plates. Equilibrium of curved rods, cylinders, and spheres. Not given in 1941-42. First semester. Mr. Reynolds

Math. 218. Theory of Elasticity (3).

Continuation of Math. 217. Not given in 1941-42. Second semester. Mr. Reynolds

Math. 219. Selected Topics in Quantum Mechanics and Relativity (3).

Lagrange's equations; Hamilton's partial differential equation; Schrödinger's wave equation with incidental introduction of characteristic functions of second order differential equations; the work of Dirac and others. The relativity part of the course is of the conventional type. Not given in 1941-42. First semester. Mr. Lamson

Math. 220. Selected Topics in Quantum Mechanics and Relativity (3).

Continuation of Math. 219. Not given in 1941-42. Second semester. Mr. Lamson

Math. 221. Aerodynamics (3).

Hydrodynamics, equations of motion, steady flow around obstacles, vortex theory. Application to wing and propeller theories, lift and drag. Prerequisite: Math. 126. First semester. Mr. Shook

Math. 223. Differential Geometry (3).

The differential geometry of curves and surfaces. Prerequisite: Math. 106. Not given in 1941-42. First semester. Mr. Cutler

Math. 224. Differential Geometry (3).

Continuation of Math. 223. The differential geometry of surfaces and Riemann spaces; tensor analysis. Not given in 1941-42. Second semester. Mr. Cutler

Math. 225. Operational Calculus and Tensor Analysis (3).

A course designed primarily for electrical engineers and physicists, giving a rigorous foundation in the operational calculus and the modern technique of tensor analysis. Considerable time is devoted to physical application, especially to electrical networks and machinery. Not given in 1941-42. Second semester. Mr. Vanderslice

Math. 227. Finite Differences and Difference Equations (3).

The calculus of finite differences, the difference equation in the domain of real variables with special reference to the linear recurrent relation, boundary value and oscillation theorems, applications to mechanics and electrical theory. Prerequisite: Math. 106. Not given in 1941-42. First semester. Mr. Fort

Math. 228. Linear Difference Equations (3).

Continuation of Math. 227. The linear difference equation in the domain of the complex variable, existence theorems, etc. Prerequisites: Math. 227 and a course in the theory of functions of a complex variable. Not given in 1941-42. Second semester. Mr. Fort

Math. 229. Advanced Analytic Mechanics (3).

Conservative and non-conservative fields; generalized coordinates; Lagrange's equations; Hamilton's canonical equations; holonomic and non-holonomic systems; gyroscope motion, etc. Prerequisite: Math. 121. First semester. Mr. Raynor

Math. 230. Advanced Analytic Mechanics (3).

Continuation of Math. 229. Second semester.

Mr. Raynor

Math. 231. Calculus of Variations (3).

Fundamental existence theorems of analysis. The classical theory of necessary and of sufficient conditions for relative minima of single integrals. Fields of extremals and the Hamilton-Jacobi theory. Numerous physical and mechanical applications and extensions to be chosen according to the special interests of the students. First semester.

Mr. Smiley

Math. 239. Theory of Numbers (3).

Divisibility properties. Congruences. Quadratic reciprocity and quadratic congruences. Quadratic forms. Diophantine approximations. Not given in 1941-42. First semester.

Mr. Perkins

Math. 241. Theory of Functions of Real Variables (3).

Brief discussion of the real numbers. Continuous functions, semi-continuous functions, functions of bounded variation, and other important classes. The derivative. Modern theory of measure and integration. Important inequalities. Implicit function theorem and other existence theorems of analysis. First semester.

Mr. Pitcher

Math. 242. Introduction to Topology (3).

Elements of point set topology with emphasis on applications to Euclidean spaces and spaces of functions. Combinatorial topology with applications of connectivity. Second semester.

Mr. Pitcher

Math. 250. Modern Algebra (3).

The basic concepts of algebra: groups, rings, fields and linear algebras. The structure of finite groups, including isomorphism theorems and the Jordan-Hölder Theorem. Galois theory of equations. Applications to special problems. First semester.

Mr. Perkins

ASTRONOMY

The undergraduate major in mathematics and astronomy consists of at least twenty-four semester hours college credit in mathematics and astronomy. It must include Math. 1 (or 1a), 11, 12, 13, 14 and Astr. 2 and 3, except that students having entrance credit in plane trigonometry do not take Math. 1. The twelve hours advanced credit required shall not include Math. 1, 1a, 11, 12, 13, 14, 15, 16, 20, 40 or Astr. 1.

Astr. 1. Descriptive Astronomy (3).

The earth as an astronomical body, the solar system, a brief introduction to sidereal astronomy. First and second semesters.

Astr. 2. General Astronomy (3).

The solar system, the sidereal system with an introduction to celestial mechanics and astrophysics. Prerequisite: Math. 13. Second semester.

Astr. 3. Practical Astronomy (3).

Instruments used: methods of taking and reducing observations to determine time, latitude, and azimuth, observatory work in which each student makes his own observations and computations in illustration of the theory studied. Prerequisite: Astr. 2, Math. 14. First semester.

**MECHANICAL ENGINEERING AND INDUSTRIAL
ENGINEERING**

PROFESSORS F. V. LARKIN, KLEIN, BUTTERFIELD, AND STUART
ASSOCIATE PROFESSOR CONNELLY
MESSRS. JACKSON, HOLME, BAILEY, EPPES, FORSTALL, WARNER
KELLER, POWERS AND WILLIAMS

MECHANICAL ENGINEERING

M.E. 1. Elementary Machine Design (3).

Graphical statistics of mechanisms and elementary strength of materials in the design of fastenings and shafting. Prerequisite: *Freshman Math., Phys., and Drawing*. First and second semesters.

M.E. 2. Elementary Heat Engines (3).

Elementary thermodynamics, properties of steam, power plant auxiliaries, heat engine cycles, fuels, boilers, steam engines, steam turbines, internal combustion engines. Prerequisites: *Freshman Math., Phys., and Chemistry*. First and second semesters.

M.E. 4. Elementary Machine Design (3).

Continuation of M.E. 1 with kinematics and the design of simple machines. Prerequisites: *Freshman Math, Phys., and Drawing*. Second semester.

M.E. 5. Heat Engines (3).

Continuation of M.E. 2. Prerequisites: *Freshman Math., Phys., and Chemistry*. Second semester.

M.E. 9. Engineering Laboratory (1).

Use and calibration of instruments; elementary tests on steam engines, pumps, and boilers. Prerequisites: M.E. 2. Fee, \$6.00. First semester.

M.E. 11. Engineering Laboratory (1).

Continuation of M.E. 9. Laboratory experiments of flow of fluids, tests of steam engines, turbines, air compressors, heat transfer equipment, internal combustion engines. Prerequisite: M.E. 2. Fee, \$6.00. Second semester.

M.E. 15. Thesis (3).

Candidates for the degree of B.S. in M.E. may, with the approval of the department staff, undertake a thesis as a portion of the work during the senior year. Prerequisites: C.E. 32, M.E. 33. First or second semester.

M.E. 19. Engineering Laboratory (1).

A one semester course for non-mechanical students, covering principles of measurements, tests of boilers, steam engines, steam turbines, air compressors, internal combustion engines. Prerequisites: *M.E. 2, or equivalent.* Fee, \$6.00. First and second semesters.

M.E. 21. Engineering Laboratory (1).

For non-mechanical students. Use and calibration of instruments, tests of steam engines, steam turbines, boilers, air compressors, internal combustion engines, pumping equipment. Prerequisite: *M.E. 22 or equivalent.* Fee, \$6.00. First semester.

M.E. 22. Heat Engines (3).

For non-mechanical students. Fuels, combustion, engineering thermodynamics, properties of steam, steam power plant equipment and cycles, internal combustion engines. Prerequisites: *Math. 13 and Phys. 23 previously or concurrently.* First semester.

M.E. 23. Heat Engines (3).

Continuation of M.E. 22. Prerequisites: *Math. 13 and Phys. 23 previously or concurrently.* Second semester.

M.E. 24. Engineering Laboratory (4).

Use and calibration of instruments, tests of heat transfer apparatus, prime movers, refrigeration machinery, and power plant equipment, application of the principles of engineering thermodynamics to fluid flow and psychrometry. Methods of graphical and tabular representation of data. Prerequisite: *M.E. 29 or equivalent.* Fee, \$6.00. Summer session: eight hours of laboratory work with supplementary lectures each weekday for four weeks.

M.E. 25. Engineering Laboratory (1).

Continuation of M.E. 21. Prerequisite: *M.E. 22 or equivalent.* Fee, \$6.00. Second semester.

M.E. 26. Flight Theory (4).

History of aviation, air navigation, meteorology, theory of flight, airplane engines, instruments, civil air regulations. Prerequisites: sophomore standing, satisfactory physical and scholastic records, consent of parents, consent of instructor. Fee \$40.00. First and second semesters.

M.E. 29. Heat Engines (3).

A one semester course for non-mechanical students. Combustion, properties of steam, power plant equipment, internal combustion engines. Prerequisites: *Math. 13 and Phys. 23 previously or concurrently.* First and second semesters.

M.E. 33. Thermodynamics (2).

Energy operations, entropy, flow of fluids, power plant cycles, application of principles to steam power equipment and to compressors. Prerequisite: *M.E. 2 or equivalent.* First and second semesters.

M.E. 35. Internal Combustion Engines (2).

Thermodynamics of internal combustion engine cycles, spark and compression ignition engines, carburetion, fuel injection, special problems of the Diesel engine. Prerequisite: *M.E. 5.* Second semester.

M.E. 40. Machine Design (3).

Strength and kinematics in the design of machines including cams, gear trains, flywheels, and engine balance. Prerequisite: *M.E. 1.* First and second semesters.

For Advanced Undergraduates and Graduates

Graduate students desiring to take the following courses should present as prerequisites: integral calculus, mechanics of materials, and elementary heat engines.

M.E. 114. Engineering Laboratory (2).

Comprehensive tests of power plant equipment, internal combustion engines, refrigeration machinery. Prerequisite: *M.E. 9.* Fee, \$6.00. First semester.
Messrs. Stuart, Jackson

M.E. 116. Mechanics of Compressible Fluids (3).

Study of the behavior of real fluids. Physical properties of fluids, viscosimetry. Laws of dynamic similitude and use of dimensionless parameters. Laminar and turbulent flow. Flow of compressible fluids through pipes, orifices and curved channels, lubrication and heat transfer. Prerequisite: *senior or graduate standing in engineering.* Second semester.
Messrs. Stuart, Jackson

M.E. 117. Air Conditioning and Refrigeration (3).

Application of thermodynamics to fields of refrigeration, air conditioning, heating, ventilating. Study of typical systems. Advanced work in heat transfer and flow of fluids. Prerequisite: *M.E. 33.* First semester.
Messrs. Klein, Bailey

M.E. 118. Engineering Laboratory (2).

Continuation of *M.E. 114* supplemented by complete tests of power plants in the vicinity and original investigations. Prerequisite: *M.E. 9.* Fee, \$6.00. Second semester.
Messrs. Stuart, Jackson

M.E. 119. General Aeronautics (3).

A theoretical course in aeronautics, including aerodynamics of the air-plane and propeller, also navigation and navigating instruments. Prerequisite: *senior standing in the college of engineering.* First semester.
Mr. Butterfield

M.E. 120. Aeronautical and Automotive Engines (3).

Thermodynamic and mechanical design features, carburetors, supercharges, and accessories, air and liquid cooling, spark and compression ignition; performance under varying operating conditions. Prerequisite:

senior standing in the College of Engineering; M.E. 33 or equivalent.
Second semester. Messrs. Butterfield, Jackson

M.E. 121. Advanced Machine Design (3).

Design calculations for a complete machine. Laboratory and classroom balancing of a 75 hp. steam engine. Prerequisites: *M.E. 40, C.E. 32.*
First semester. Mr. Connelly

M.E. 122. Advanced Machine Design (3).

Advanced problems in machine design including unsymmetrical bending, differential strains, governing, and vibration. Prerequisites: *M.E. 40, C.E. 32.* Second semester. Mr. Connelly

M.E. 123. Power Plants (3).

A study of the relation of the various pieces of power plant equipment to each other. Calculations for the design of power plant elements. Comparison of different types of plants driven by both steam and internal combustion engines. Utilization of exhaust heat. Prerequisite: *M.E. 33 or equivalent.* Second semester. Messrs. Klein, Jackson

M.E. 124. Advanced Work in Engineering Laboratory (4).

Continuation of M.E. 24. Prerequisite: *M.E. 24 or equivalent.* Fee, \$6.00. Summer session: eight hours of laboratory work each week-day for four weeks. Mr. Jackson

M.E. 125. Air Conditioning (3).

Continuation of M.E. 117. Advanced work in the field of air conditioning. Design of typical systems based on fundamental laws of heat transfer and fluid flow. Study of automatic methods of controlling temperature and humidity. Classroom and laboratory work. Prerequisite: *M.E. 117 or equivalent.* Second semester. Mr. Bailey

M.E. 134. Plant Proseminar (1).

Proseminar covering the material of M.E. 114, concerned primarily with trips to industrial plants and discussions of mechanical processes and equipment. Prerequisite: *M.E. 9.* First semester. Messrs. Larkin, Stuart

M.E. 138. Plant Proseminar (1).

Continuation of M.E. 134 but covering the material in M.E. 118. Prerequisite: *M.E. 9.* Second semester. Messrs. Larkin, Stuart

M.E. 141. Machine Analysis Laboratory (1).

Laboratory balancing of rotating equipment; stroboscopic study of machine operation; studies in suitability of materials. Prerequisite: *M.E. 40.* First semester. Mr. Connelly

Students taking any of the courses in engineering laboratory are subject to call for one twenty-four hour test a semester.

For Graduates

Math. 217 and 218, Theory of Elasticity, Math. 221, Aerodynamics, and E.E. 217 and 218, Economics of Electric Power, may be included in a graduate major in mechanical engineering.

M.E. 200. Advanced Engineering Thermodynamics (3).

Energy equations; availability and entropy; general equations; formulation of vapor properties; action of steam in nozzles and turbines; supersaturation, gas properties; gas reactions in combustion. Prerequisite: *graduate standing in engineering*. First semester. Messrs. Klein, Stuart

M.E. 201. Advanced Engineering Thermodynamics (3).

Continuation of M.E. 200. Prerequisite: *graduate standing in engineering*. Second semester. Messrs. Klein, Stuart

M.E. 203. Internal Combustion Engines (3).

History: laws of mixing, carburetion, atomization, combustion, and chemical equilibrium; heat losses; friction losses; governing; gas engine cycles; vibration and balancing; engine types. Prerequisite: *graduate standing in engineering*. First semester. Mr. Butterfield

M.E. 204. Internal Combustion Engines (3).

Continuation of M.E. 203. Prerequisite: *graduate standing in engineering*. Second semester. Mr. Butterfield

M.E. 207. Steam Turbines (3).

Theory of the steam turbine; classification; discussion of types; operation and governing; principles underlying the design of turbine parts; critical velocities. Prerequisite: *graduate standing in engineering*. First semester. Mr. Klein

M.E. 208. Steam Turbines (3).

Continuation of M. E. 207. Prerequisite: *graduate standing in engineering*. Second semester. Mr. Klein.

M.E. 211. Advanced Engineering Laboratory (3).

Original investigations and advanced testing in the field of mechanical engineering preceded by a study of the methods of precision measurements required. Prerequisites: *graduate standing in engineering, courses in engineering laboratory and thermodynamics*. Fee, \$6.00. First semester. Messrs. Stuart, Jackson

M.E. 212. Advanced Engineering Laboratory (3).

Continuation of M.E. 211. Prerequisites: *graduate standing in engineering, courses in engineering laboratory and thermodynamics*. Fee \$6.00 Second semester. Messrs. Stuart, Jackson

M.E. 216. Advanced Mechanics of Compressible Fluids (3).

Boundary layer theory. Action of compressible fluids in compressors, fans, steam turbines, and other mechanical equipment. Heat transfer and lubrication. Prerequisite: *M.E. 116 or equivalent*. Second semester. Messrs. Stuart, Jackson

INDUSTRIAL ENGINEERING

I.E. 1. Industrial Employment.

Following the junior year, students are required to do a minimum of eight weeks of practical work, preferably as student apprentices, in the work they plan to follow after graduation. A report, typewritten and bound, is required. Prerequisite: *sophomore standing*.

I.E. 2. Industrial Management (3).

A course in the essential problems of organization, financial administration, plant layout, production control, and employment policies of industrial enterprises. Prerequisites: *Eco. 3 and 4*. First semester.

I.E. 3. Industrial Management (3).

Continuation of I.E. 2. Prerequisites: *Eco. 3 and 4*. Second semester.

In I.E. 2 and I.E. 3 a maximum of three half-day inspection trips a semester is required.

I.E. 5. Thesis (3).

Candidates for the degree of B.S. in Industrial Engineering may, with the approval of the department staff, undertake a thesis as a portion of the work of the senior year. Prerequisites: *C.E. 32, Acctg. 4*. First and second semesters.

I.E. 13. Industrial Engineering (3).

A study of the engineering and economic problems arising in manufacturing industries. Lectures, problem exercises, trips, and collateral reading. Prerequisites: *Eco 3, M.E. 1, and M.E. 5*. First and second semesters.

For Advanced Undergraduates and Graduates

I.E. 111. Industrial Administration (3).

A management study of the industrial organization, its formation, duties, authority, responsibility and control. Lectures and drawing room problems or proseminar. Prerequisite: *I.E. 13*. First semester.

Messrs. Connelly, Holme

I.E. 112. Personnel Administration (3).

A management study of the personnel organization, its employment, training, safety and reward. Lectures and drawing room problems or proseminar. Prerequisite: *I.E. 13 or equivalent*. Second semester.

Messrs. Connelly, Holme

For Graduates

Candidates for the degree of Master of Science with a major in industrial engineering may include in their program graduate courses in engineering and psychology for which they have the necessary prerequisites: also Math. 217, 218, 221. The major must include a minimum of twelve hours of graduate courses in technical engineering, at least six of which must be in indus-

trial engineering. A thesis may be required. The collateral work will normally be taken in the College of Business Administration.

I.E. 200. Management Policies (3).

Analysis of the factors entering into the determination of management policies. Discussion of case material bearing upon the organization, location, growth, size, socialization, and control of types of industries. Prerequisite: *elementary courses in industrial management*. First semester.

Mr. Larkin

I.E. 201. Personnel Policies (3).

Analysis of the factors entering into the determination of personnel policies. Discussion of case material bearing on the worker and his relation to industry, selection, health, training, safety, wages, welfare, and retirement. Prerequisite: *six hours in industrial management*. Second semester.

Mr. Larkin

METALLURGICAL ENGINEERING

PROFESSORS DOAN, STOUGHTON, AND BUTTS

ASSISTANT PROFESSOR FRYE

MR. STOUT

Met. 2. Metallurgy of Iron and Steel (2).

Same as Met. 52, but without plant visits or laboratory exercises. Prerequisites: Met. 21 or 51. Second semester.

Met. 3. Metallurgy of Copper, Lead, and Associated Metals (2).

Same as Met. 53, but without plant visits or laboratory work. Prerequisites: Met. 21 or 51. First semester.

Met. 5. Electrochemistry (1).

Lectures and recitations concerning the phenomena of electrolysis and electrolytic conduction; current phenomena; voltage phenomena; energy relations; electrode reactions; the electrolytic cell; primary cells and storage batteries. Prerequisites: Chem. 1 or 3, and 20, Phys. 24. First semester.

Met. 21. Engineering Metallurgy (2).

An abridgment of Met. 51, 52, 53, and 54, especially adapted to the viewpoint of users of metals. Prerequisites: Chem. 1 or 3, Phys. 22. First and second semesters.

Met. 33. Metallurgical Laboratory (1).

The internal structure and properties of metals and industrial alloys; effect of cold working and heat treatment. Welding. Use of instruments and apparatus employed in metallurgical work. Prerequisites: Phys. 23 and 24, Met. 21, previously or concurrently. Fee, \$5.00. First and second semesters.

Met. 34. Metallurgical Laboratory (1).

Continuation of Met. 33. Prerequisites: Phys. 23 and 24, Met. 51 and 21, previously or currently. Fee \$5.00. Second semester.

Met. 49. Summer Work.

At the end of the junior year students in the curriculum of metallurgical engineering who do not take Mil. 9 or 19 are required to secure in industrial plants at least eight week's practical experience.

Met. 51. Introduction to Metallurgy (3).

The application of physics and chemistry to metallurgical operations. Ores, fuels, combustion, pyrometry, refractories, furnaces, metallurgical processes and products, and economic factors. Lectures, daily questions on textbook, plant visits, and laboratory exercises. Preliminary training in writing engineering reports. Prerequisites: Chem. 1 or 3, Phys. 22. Fee, \$5.00. First semester.

Met. 52. Metallurgy of Iron and Steel (3).

Chemical and physical properties of iron and steel. Manufacturing processes. Lectures and daily questions on textbook, plant visits, and laboratory exercises. Prerequisites: Met. 51 or 21. Fee, \$5.00. Second semester.

Met. 53. Metallurgy of Copper, Lead, and Associated Metals (3).

Production processes and properties of copper and its alloys, lead and its alloys, gold, silver, platinum, selenium and tellurium, bismuth. Lectures, written exercises on textbook assignments, plant visits and laboratory work, with formal written reports thereon. A two- or three-day inspection trip (expense about \$10.00) is required. Prerequisite: Met. 51 or 21. First semester.

Met. 54. Metallurgy of Zinc, Aluminum, and the Minor Metals (2).

Production processes and properties of aluminum and its alloys, zinc, tin, nickel, gold, silver, mercury, antimony etc. A one-day inspection trip (expense about \$3.00) is required. Prerequisite: Met. 51 or 21. Second semester.

Met. 61. Problems in General Metallurgy (1).

A course of problems embodying the use of physical, chemical and mechanical principles as the basis of practical metallurgy. Data are taken, as far as possible from actual practice, so that the results have an important bearing in the understanding of metallurgical process. Prerequisites: Chem. 1 or 3, and 8, Phys. 22. Second semester.

Met. 62. Problems in Iron and Steel Metallurgy (1).

A course of problems involving the fundamental principles of the various processes in the metallurgy of iron and steel to give the student an understanding of the quantitative relationship in the processes. Pre-

requisites: *Met. 52 or 21, previously or concurrently; Met. 51 and 61, 81, or 83.* Second semester.

Met. 81. Short Course in Metallurgical Engineering Problems (1).

An abridgment of *Met. 61 and 62.* Prerequisites: *Chem. 8; Met. 51 or 21, previously or concurrently.* First and second semesters.

Met. 91. Thesis in Metallurgy (3).

Candidates for the degree of B.S. in Metallurgical Engineering may, with the approval of the head of the department, undertake a thesis as a portion of the work during the senior year. Deposit, \$10.00. First or second semester.

For Advanced Undergraduates and Graduates

Met. 108. Electrometallurgy (3).

Lectures discussing the practical application of electricity to metallurgical processes. Electrolytic and electric furnace plants and practice. Prerequisites: *Met. 51 or 21; Met. 125.* Second semester. Mr. Butts

Met. 125. Electrochemistry and Electrometallurgy (2).

Lectures and written recitations concerning current and voltage in electrolysis, energy relations, electrode reactions, primary cells and storage batteries; electric furnaces, and practical applications of electricity to metallurgical processes. Prerequisites: *Chem. 20, Met. 51 or 21. Phys. 24.* First semester. Mr. Butts

Met. 130. Physical Metallurgy (3).

The states of matter; physical structure and constitution of metals; X-rays and crystal structure; effect thereon of mechanical working, heat treatment and composition. Casting, shaping, welding, and testing metal objects. Lectures and laboratory work. Prerequisites: *Chem. 1 or 3, Phys. 22; Met. 51 or 21.* Fee, \$5.00. Second semester. Mr. Frye

Met. 131. Metallography (3).

Internal structures of alloys and the constitutional diagram. The relation between structure and properties in industrial alloys. Quenching and aging. Lectures, problems, and laboratory experiments. Prerequisites: *Chem. 1 or 3, Phys. 22; Met. 51 or 21, and 130.* Fee, \$5.00. First semester. Mr. Doan

Met. 135. Electrochemical Laboratory (1).

Quantitative relations in the deposition of metals by electrolysis. Experimental study of the conditions controlling the nature of electrolytic deposits, electrolysis of fused salts, cathodic and anodic reactions. Prerequisites: *Chem. 30, Met. 51 or 21, Phys. 24, Met. 5 or 125, previously or concurrently.* Fee, \$5.00. First semester. Mr. Butts

Met. 139. Metallurgical Colloquium (1).

An opportunity for the student to develop (1) an acquaintance with the current metallurgical literature, (2) the ability to interpret it clearly,

and (3) skill in presenting oral engineering reports. Prerequisites: *Met. 51 or 21; Met. 52 and 130.* First semester. Mr. Doan

Met. 140. Metallurgical Colloquium (1).

Continuation of Met. 139. Prerequisites: Met. 139. Second semester. Mr. Doan

Met. 152. Advanced Metallurgy of Iron and Steel (3).

Continuation of Met. 52, for seniors and graduate students. Lectures, plant visits, laboratory exercises, written reports. Prerequisite: Met. 52 Second semester. Mr. Stoughton

Met. 153. Advanced Metallurgy of Iron and Steel (1).

Prerequisites: Met. 52 and the approval of the department head. First and second semesters. Mr. Stoughton

Met. 154. Advanced Metallurgy of Iron and Steel (1).

Prerequisites: Met. 52 and the approval of the department head. First or second semester. Mr. Stoughton

Met. 163. Problems in the Metallurgy of Copper, Lead, Gold, and Silver (1).

A course of problems concerned with the principles utilized in the metallurgy of copper, lead, silver, and gold. Prerequisites: *Met. 61 or 81, and 53, previously or concurrently; Met. 62.* First semester. Mr. Butts

Met. 164. Problems in the Metallurgy of Zinc, Aluminum, and the Minor Metals (1).

A course of problems concerned with the principles utilized in the metallurgy of zinc, aluminum, etc. Prerequisites: *Met. 61 or 81, and 54, previously or concurrently; Met. 62 and 163.* Second semester. Mr. Butts

Met. 176. Elective Projects in Metallurgy (2).

An opportunity for the advanced student to undertake a comprehensive literature investigation in a metallurgical field of his own choice. Later he defends his conclusions orally before the group and finally presents the subject in a written report. Prerequisite: high scholastic standing. First semester. Mr. Doan

Met. 177. Elective Projects in Metallurgy (2).

Continuation of Met. 176. Second semester. Mr. Doan

For Graduates

NOTE: Not all of the courses listed below will be given in any one year. Those to be given will be determined by the number of applicants at the beginning of the semester; if the number is less than six, the course may be omitted.

Met. 201. Metallurgical Investigation and Thesis (4-6).

Investigation of some special metallurgical problem, such as: an improvement or innovation in some metallurgical process; the establishment

of an equilibrium diagram; the effect of heat treatment on a metal or alloy. Study of the literature. The study and investigation must be embodied in a written report. Prerequisite: undergraduate metallurgical course in the field of investigation. First and second semesters.

Messrs. Doan, Stoughton, Butts

Met. 202. Metallurgical Investigation and Thesis (3).

Continuation of Met. 201. First and second semesters.

Messrs. Doan, Stoughton, Butts

Met. 203. Advanced Electrometallurgy (3).

Specialized study in some particular field of electrochemistry or electrometallurgy selected by the student, such as electrode reactions, thermodynamics of electrolysis, electroplating, electrolytic refining, electrothermics, electrothermal efficiencies, industrial processes. Prerequisite: Met. 125. First or second semester.

Mr. Butts

Met. 205. Non-ferrous Metallurgy (3).

Detailed study of the metallurgy of any one or more of the non-ferrous metals, including historical evolution, reading of references on modern practices, and theoretical consideration of the possibilities of future development in manufacture or use. Both chemical and physical metallurgy of the alloys may be included. Prerequisite: a course in non-ferrous metallurgy. First or second semester.

Mr. Butts

Met. 208. The Phase Rule (3).

Heterogeneous equilibria in binary and ternary alloy systems in the light of the phase rule. Construction and interpretation of ternary constitutional diagram models. Prerequisites: Met. 131, facility in reading German. First or second semester.

Mr. Doan

Met. 209. The Metallic State (3).

Advanced studies of the states of aggregation in metals, of the properties of metallic crystals and crystal aggregates and the effects upon them of deformation, temperature, and pressure. Prerequisites: Met. 130, facility in reading German. First or second semester.

Mr. Frye

Met. 210. The Physical Chemistry of the Metals (3).

The principal fields of physical chemistry in their relation to the extraction of metals from their ores, the refining, alloying, heat treatment, welding, coating and corrosion of metal systems. Prerequisites: one undergraduate course in physical chemistry; and elementary ferrous or non-ferrous metallurgy, or Met. 130 and 131; facility in reading German. First or second semester.

Mr. Doan

Met. 211. The Principles of Modern Welding (3).

The foundations in scientific principle upon which the welding processes rest; the present limitations of the various processes; the trends in new developments; the engineering, industrial, and commercial aspects of welding. Prerequisites: Met. 130 and 131. First or second semester.

Mr. Doan

Met. 212. Radiography in Principle and Practice (3).

The principles of radiography. X-rays and gamma rays. Industrial practices. Prerequisites: Phys. 122 and Met. 130. First or second semester.

Mr. Doan

Met. 215. Stainless Steels (3).

Special problems relating to the making, rolling, finishing, fabricating, and welding of corrosion resistant and heat resistant alloys of iron with chromium and additional alloying elements commonly used. Equilibrium diagrams of iron and chromium with and without other elements sometimes added to stainless steel, such as nickel molybdenum, etc. The properties of the different typical alloys and their uses in industry and modern civilization. Prerequisites: ferrous metallurgy; and previously or concurrently, Met. 130, 131, and 152. First or second semester.

Mr. Stoughton

Met. 217. Nickel Steels (3).

Special problems encountered in the making, fabricating, finishing, and welding of the alloys of iron and nickel, and in the utilization of steel scrap containing "residual nickel". Metallography, equilibrium diagrams, and properties. Prerequisites: ferrous metallurgy; and, previously or concurrently, Met 130, 131, and 152. First or second semester.

Mr. Stoughton

Met. 219. Alloy Steels (3).

Alloy steels other than chromium and nickel, especially alloys with manganese, silicon, molybdenum, vanadium, tungsten. High speed steels, steels for electromagnets and permanent magnets. Ternary and quaternary alloy steels for heat treating, especially for automotive, airplane, and special machinery parts. Prerequisites: ferrous metallurgy; and, previously or concurrently, Met. 130, 131, and 152. First or second semester.

Mr. Stoughton

Chem. 236 and 237, X-ray Research, may be included in a graduate major in metallurgy.

MILITARY SCIENCE AND TACTICS

COLONEL LEONARD

LIEUTENANT COLONEL BRIAN, CAPTAINS BARROWS, SCHWARTZ,
AND PHILLIPS, LIEUTENANTS PIERCE AND CAMPBELL
TECHNICAL SERGEANT GASDA, STAFF SERGEANT DUBY,
SERGEANT BECK

An infantry unit of the Reserve Officers' Training Corps was established at Lehigh University in September, 1919, and an ordnance unit was established in September, 1925. By action of the trustees and faculty of the University the basic course, military science and tactics, was made a required subject for physically fit freshmen and sophomores.

The military courses are conducted under War Department regulations and consist of two years of basic work common to

infantry and ordnance, and two years of advanced work along specialized lines. Students are selected to pursue the advanced courses on the basis of their proficiency in leadership and scholarship displayed during the basic course. Selections for the ordnance course are usually confined to students in mechanical, chemical, metallurgical, and electrical engineering, and engineering physics. The number selected for the advanced courses is limited by War Department funds made available annually.

Provision is made for students electing the advanced courses to substitute them for work which would otherwise be required in their respective curricula. Students who complete the four-year course satisfactorily become eligible for commissions as second lieutenants in the Officers' Reserve Corps.

Uniforms and equipment are furnished by the government to basic students, but each student must provide suitable shoes. A cash deposit of \$25.00 is required, payable at the time of registration and refunded in full upon the return of the property issued by the department. Advanced course students are paid commutation of uniform and subsistence which is more than sufficient to cover the purchase of their officers' uniform and equipment.

The summer camp period is the six weeks immediately following the close of school in June. The infantry camp is usually established at Fort George G. Meade, Maryland, and the ordnance camp at Aberdeen Proving Ground, Maryland. Students are given a travel allowance to cover the journey to and from camp, and are paid and subsisted at camp at government expense.

Infantry Unit

Mil. 1. Basic Course, First Year (2).

Fundamental military training common to all arms of the service. Theoretical and practical instruction in map reading, marksmanship, military courtesy, military hygiene and first-aid, leadership, obligations of citizenship, military history and policy, and military organization. Two recitations and one drill period a week. First semester.

Mil.2. Basic Course, First Year (2).

Continuation of Mil. 1. Second semester.

Mil. 3. Basic Course, Second Year (2).

Fundamental military training common to all arms of the service. Theoretical and practical instruction in leadership, musketry, automatic rifle, scouting and patrolling, and combat principles of rifle squad and platoon. Students who indicate suitable proficiency in this course are ap-

pointed corporals in the R. O. T. C. unit. Two recitations and one drill period a week. First semester.

Mil. 4. Basic Course, Second Year (2).

Continuation of Mil. 3. Second semester.

Mil. 5. Advanced Infantry, First Year (3).

Theoretical and practical instruction in leadership, airplane photographs, infantry weapons (machine gun, 37mm. and infantry mortars), combat principles, rifle and machine gun section and platoon, military administration, defense against chemical warfare, and care and operation of motor vehicles. Students who indicate suitable proficiency in this course are appointed sergeants in the R. O. T. C. unit. Three recitations and one drill period a week. First semester.

Mil. 6. Advanced Infantry, First Year (3).

Continuation of Mil. 5. Second semester.

Mil. 7. Advanced Infantry, Second Year (3).

Theoretical and practical instruction in mechanization and motorization, organized Reserve Corps regulations, military history and national defense policy, combat principles, tactical exercises, map problems, leadership, military law, tanks, anti-aircraft and anti-tank defense, combat intelligence, and infantry signal communications. Students who indicate suitable proficiency in this course are appointed commissioned officers in the R.O.T.C. unit and upon graduation are appointed second lieutenants in the Infantry Officers' Reserve Corps. Three recitations and one drill period a week. First semester.

Mil. 8. Advanced Infantry, Second Year (3).

Continuation of Mil. 7. Second semester.

Mil. 9. Advanced Camp, Infantry (3).

Compulsory for students who elect the advanced course. Generally taken in summer between junior and senior years.

Ordnance Unit

Mil. 15. Advanced Ordnance, First Year (3).

Theoretical and practical instruction in leadership, material, ammunition and explosives, current ordnance problems. Organization of the ordnance department, defense against chemical warfare, aerial photographs, and military administration. Students who indicate suitable proficiency in this course are appointed sergeants in the R.O.T.C. unit. First semester.

Mil. 16. Advanced Ordnance, First Year (3).

Continuation of Mil. 15. Second semester.

Mil. 17. Advanced Ordnance, Second Year (3).

Theoretical and practical instruction in leadership, property accounting and ordnance financial procedure, military law, industrial mobilization, current ordnance problems, military history and policy, O. R. C. regu-

lations, and ordnance field service. Students who indicate suitable proficiency in this course are appointed officers in the R.O.T.C. unit and upon graduation are appointed second lieutenants in the Ordnance Officers' Reserve Corps. First semester.

Mil. 18. Advanced Ordnance, Second Year (3).

Continuation of Mil. 17. Second semester.

Mil. 19. Advanced Camp, Ordnance (3).

Compulsory for students who elect the advanced course. Generally taken in summer between junior and senior years.

MINING ENGINEERING

PROFESSORS CALLEN AND ECKFELDT
ASSOCIATE PROFESSOR SINKINSON
MR. STAUTH

Min. 3. Ore Dressing; Coal Preparation and Laboratory (3).

Recovery of minerals from ores; machines and apparatus used for coarse and fine crushing; classifying and preparation for concentration; methods of concentration, including gravity and magnetic methods, flotation, etc. Treatment of ores in concentrating plants; visits to mills; experimental work in ores; principles of concentration applied to the preparation of coal. Visit to breakers and coal washers. Prerequisites: *Geol. 1 or 2, Phys. 23, 24, Chem. 36, Min. 22.* Fee, \$5.00. First semester.

Min. 6. Mine Surveying (3).

Forms for notes; surface surveys; determination of true meridian, latitude, and time from observations on Polaris and sun; U.S. public land surveys; connecting surface with mine surveys through tunnels, slopes, and shafts; calculation of notes; mine mapping, mine problems; practice in mine surveying. Prerequisite: *C.E. 6.* Second semester.

Min. 7. Construction (2).

Construction methods; use of stone, concrete, brick, steel, wood, etc., in building operations; erection and rigging; pipe-work; construction schedules. Prerequisite: junior standing. First semester.

Min. 8. Oil Field Practice (2).

Distribution of petroleum and natural gas; valuation of oil lands. Location of wells; development-drilling, production methods. Transportation; storage; fires; avoidable waste, conservation of oil and gas resources. Refining methods; casing-head gasoline. Prerequisites: *Geol. 10, Phys. 23, 24.* Second semester.

Min. 10. Fuel Technology (2).

Solid fuels: sampling; proximate and ultimate composition of coals, calorific values, fusibility of ash; classification of coal; carbonization, both low- and high-temperature; gasification of fuel. Prerequisite: *one year of college chemistry.* First semester.

Min. 11. Fuel Technology (2).

Liquid fuels: classification, physical properties, and chemical aspects of petroleum and its constituents; non-petroleum fuels; combustion of petroleum and its derivatives; mechanism of combustion; kinetics of the oxidation of hydrocarbons. Prerequisite: *one year of college chemistry*. Second semester.

Min. 12. Fuel Technology Laboratory (1).

Coal and gas analysis, calorimetry, pyrometry, testing coals for yield of distillation products at low and high temperatures; extraction of coal by solvents. Prerequisites: *Chem. 36 and 48 or equivalent; Min. 10 concurrently*. Deposit, \$10.00. First semester.

Min. 13. Fuel Technology Laboratory (1).

Chemical and physical examination of liquid fuels; calorimetry, vapor pressure tests of gasoline, viscosity of lubricants by standard methods. Prerequisites: *Chem. 36 or 48 or equivalent; Min. 11 concurrently*. Deposit, \$10.00. Second semester.

Min. 15. Mining Engineering (3).

A survey of the elements of mining engineering for students in curricula other than mining engineering. Prospecting, boring, excavation, support, mining methods, transportation, drainage, ventilation, lighting, mineral preparation. Prerequisite: *junior standing*. Both semesters.

Min. 20. Summer Work.

Industrial employment for eight weeks, following the junior year, with report. Prerequisite: *sophomore standing*.

Min. 21. Mining Fundamentals (3).

Drilling, explosives, and blasting; tunneling, slope- and shaft-sinking; timbering; machines for cutting and loading. Prerequisites: *Geol. 10, Math. 13, Phys. 24; C.E. 9 concurrently*. First semester.

Min. 22. Methods of Mining (3).

The methods of working bedded and vein deposits with special attention to principles involved in the selection of a mining method and to mechanization. Prerequisite: *Min. 21*. Second semester.

For Advanced Undergraduates and Graduates

Min. 101. Flotation (1).

Fundamental theories and methods employed in the flotation of metallic and non-metallic minerals. Industrial flotation flow-sheets; flotation testing. Prerequisite: *Min. 3*. Deposit, \$10.00. First semester.

Mr. Sinkinson

Min. 102. Mill Design and Flow-sheets (1).

Lectures and problems on the fundamental principles in the design of mineral concentrating mills. Methods of increasing outputs and efficiencies with existing equipment. Prerequisites: *Min. 3 and 101*. Second semester.

Mr. Sinkinson

Min. 103. Mine Ventilation (2).

A study of mine atmospheres, and gases produced or encountered in mining operations; distribution and control of the ventilating current to meet requirements of safe and efficient operation; mine fires and explosions. Prerequisites: *Min. 22 and C.E. 13*. First semester. Mr. Callen

Min. 104. Haulage, Hoisting, and Pumping (3).

The fundamentals of basic design, selection, and application of equipment for transportation of mineral products from working face to surface plant; sources, control, and disposal of mine water. Prerequisite: *Min. 22, C.E. 13, E.E. 50 and M.E. 29*. Second semester. Mr. Callen

Min. 105. Mine Administration (3).

Mining law; mine organization and management; wage systems and trade agreements; mine safety organization and regulation; special aspects of workmen's compensation laws; personnel administration. Prerequisite: *Min. 22*. First semester. Mr. Callen

Min. 106. Mining Economics (3).

Systematic exploration and examination; theory and methods of sampling; reserves; mine taxation; depreciation and depletion; valuation and reports. Prerequisite: *Acctg. 4, Min. 3 and 22*. Second semester. Mr. Callen

For Graduates

Students desiring to do graduate work in mining engineering should consult with the head of the department with regard to their qualifications.

Min. 201. Methods of Mining (3).

Study of methods used in a given mining region or in the production of a given class of materials, with respect to conditions influencing choice of method and cost. First semester Mr. Eckfeldt

Min. 202. Methods of Mining (3).

Continuation of Min. 201. Second semester. Mr. Eckfeldt

Min. 203. Mining Plant (3).

The determination of the efficiency of mining machinery of given types under varying conditions. First semester. Mr. Callen

Min. 204. Mining Plant (3).

Continuation of Min. 203. Second semester. Mr. Callen

Min. 205. Ore-Dressing and Coal Washing Plant (3).

Study of operations in dressing ores and preparation of coal. Efficiency of machines and processes. Losses in dressing. Fee, \$5.00. First semester Mr. Sinkinson

Min. 206. Ore-Dressing and Coal Washing Plant (3).

Continuation of Min. 205. Fee, \$5.00. Second semester.

Mr. Sinkinson

Min. 207. Fuel Technology Research (3).

Physical and chemical investigations of coals and fuel oils; gas analysis; ignition phenomena; mechanism of combustion; surface combustion; heat recuperation. Study of methods employed in carbonizing coal between 500° and 1200° C.; recovery of by-products; coal gas and coking industries. Deposit, \$15.00. First semester.

Mr. Sinkinson

Min. 208. Fuel Technology Research (3).

Continuation of Min. 207. Deposit, \$15.00. Second semester

Mr. Sinkinson

MORAL AND RELIGIOUS PHILOSOPHY

PROFESSOR BEARDSLEE

As a prerequisite to graduation, the University requires all of its students to take a one-hour course in the basic problems and theories of the philosophy of conduct and the philosophy of religion in order that they may acquire some familiarity with the best thought concerning the moral and spiritual problems of men. The emphasis is continually upon the certainties of knowledge and faith by which men live. The purpose is constructively to help the student to clarify and enrich his own living philosophy of life.

This requirement must be met by satisfactory completion of M.R. Phil. 10. Although this course does not carry semester hour credit toward graduation, the grade received is counted in determining the scholastic average of the student.

The courses listed below as carrying semester hour credit may be chosen as free electives and when so elected carry semester hour credit toward graduation, but none of them may be selected as a substitute for the Moral and Religious Philosophy requirement.

M.R.Phil. 10. Student Philosophy.

Analysis of basic student problems and beliefs in moral and religious experience, in the construction of personal philosophies of conduct and religion. First and second semesters.

M.R.Phil. 12. Philosophy of Conduct (1).

Analysis of such problems as: the terms good and bad, right and wrong; the sources of moral distinctions; responsibility and freedom; progress; happiness. Prerequisite: M.R.Phil. 10. First and second semesters.

M.R.Phil. 13. Philosophy of Conduct (1).

Historical and case study of systems of ethics. First semester.

M.R.Phil. 14. Philosophy of Conduct (1).

Continuation of M.R.Phil. 13. Prerequisite: M.R.Phil. 13. Second semester.

M.R.Phil. 16. Philosophy of Religion (1).

A study of the origin, nature and validity of religious experience. Prerequisite: M.R.Phil. 10. First and second semesters.

M.R.Phil. 17. Comparative Religion (1).

Philosophical study of the source materials and authoritative expositions of living religions in order to orient the student's own convictions in the varieties of effective faith. Prerequisite: M.R.Phil. 10. First and second semesters.

M.R.Phil. 18. Comparative Religion (1).

Continuation of M.R.Phil. 17. Prerequisite: M.R.Phil. 17. Second semester.

For Advanced Undergraduates and Graduates

M.R.Phil. 100. Proseminar (3).

Selected problems in ethics and the philosophy of religion. Individual conferences and seminar discussions of teacher and student reports. The instructor emphasizes current attempts to relate man to the rest of the universe and students are encouraged to make similar syntheses. Prerequisite: *junior standing*. First semester.

Mr. Beardslee

M.R.Phil. 101. Proseminar (3).

Selected problems in ethics and the philosophy of religion. Continuation of M.R.Phil. 100. Second semester.

Mr. Beardslee

MUSIC

PROFESSOR SHIELDS

Mus. 3. History and Appreciation of Music (1).

A study of the development of music from early civilization to the end of the formal period. Illustrated. First semester.

Mus. 4. History and Appreciation of Music (1).

A study of the music of the romantic period; nationalism and modern tendencies in music. Illustrated. Second semester.

Mus. 5. Harmony (3).

A study of the selection and the progression of chords. Prerequisite: some knowledge of music. Students should consult the instructor before registering for the course. First semester.

Mus. 6. Harmony (3).

Continuation of Mus. 5 and the study of modulation. Second semester.

Mus. 7. Counterpoint (2).

A study of the art of writing melody against melody in two voices, strict counterpoint in each of the five species. Prerequisite: harmony. First semester.

Mus. 8. Counterpoint (2).

Continuation of Mus. 7 in three and four part counterpoint, strict and free. Study of canon and fugue. Second semester.

THE LEHIGH UNIVERSITY BAND

Band may be elected by suitably qualified freshmen and sophomores in place of military science and tactics. It is an optional subject for suitably qualified juniors and seniors. The band is drilled according to the methods prescribed for regular army bands by one of the sergeants designated for that purpose by the head of the department of military science and tactics.

The band is required to participate in military ceremonies when called upon by the professor of military science and tactics, and to attend all football games played at home and not more than ten other home games, to be specified by the director of athletics. When it appears for military ceremonies the band is to be considered an integral part of the R. O. T. C. regiment.

Coat and cap of uniform, musical instruments, and music are furnished by the University. Members of the band furnish white flannel trousers. A deposit of \$25.00 is required from each member of the band for an instrument or uniform.

Seniors and juniors who qualify for membership in the band may substitute band work for the requirement in physical education; sophomores and freshmen may substitute band work for the requirements in physical education and in military science and tactics. Credit is not given during any semester for both band and either of the above-named subjects. Students desiring to play in the band as volunteers may do so, if qualified, and are entitled to the awards named in the following paragraph.

In addition to the above credits, one year of satisfactory service in the band entitles a student to a charm; two years of service, a sweater; three years, \$20.00 in cash; and four years, an additional \$20.00 in cash.

PHILOSOPHY

ASSISTANT PROFESSOR F. C. BECKER, Chairman
PROFESSOR HUGHES, ASSOCIATE PROFESSOR LAFFERTY

Phil. 3. Introduction to Philosophy (3).

A systematic approach to the several types of problems which philosophic inquiry brings to the fore. Textbook and collateral readings; discussions. First and second semesters.

Phil. 14. Logic and the Scientific Method (3).

An introduction to classical logic with inquiry into the nature of discovery and proof. Prerequisite: three semester hours in philosophy. First and second semesters.

For Advanced Undergraduates and Graduates

Phil. 101. Ancient Philosophy (3).

From the beginnings of scientific and philosophical reflection in Ionia to the breakdown of the ancient world. A textbook is employed to systematize and give continuity to the subject matter, but several of the more important dialogues of Plato are studied in detail, together with selections from Aristotle, and collateral reading in translations from other ancient philosophers. Prerequisite: junior standing. First semester.

Mr. Lafferty

Phil. 102. Modern Philosophy (3).

The development of philosophical thought in the seventeenth, eighteenth, and nineteenth centuries with detailed study of some representative works in this period and collateral reading of others. Prerequisite: junior standing. Second semester.

Mr. Lafferty

Phil. 107. Proseminar in Contemporary Philosophy (3).

Philosophy since 1900 in the English speaking countries, related movements in France, Germany, and Italy. Each student prepares during the year a paper on each of three contemporary philosophers representing diverse tendencies. Prerequisite: six hours in philosophy. First semester.

Mr. Becker

Phil. 108. Proseminar in Contemporary Philosophy (3).

Continuation of Phil. 107. Second semester.

Mr. Becker

Phil. 109. The Theory of Art and of Beauty (3).

An attempt to reach a consistent, inclusive account of the place of the esthetic in the life of man and in social organization and history. Lectures, reports, and discussions. Prerequisite: junior standing. First semester.

Mr. Hughes

Phil. 112. The Theory of Human Relations (3).

Social and political philosophy; a critical examination of the classical theories in this field, and of their assumptions with regard to human nature, justice, and liberty. Historical and constructive. Readings, class discussions, papers. Prerequisite: junior standing. Second semester.

Mr. Becker

Phil. 115. Ethics: The Theory of Conduct (3).

The first part of this course approaches conduct in terms of the success and failure of different types of individual life-careers; the second part studies conduct from the standpoint of society. Problems of conduct are then viewed as requiring the harmonization of these two factors. Prerequisite: junior standing. Second semester. Mr. Hughes

Phil. 116. The Theory of Nature (3).

A survey of methods used in the study of nature, with a view to their harmonization. Prerequisite: junior standing. Second semester. Mr. Hughes

Phil. 117. Current Philosophical Problems (3).

The questions that are now to the fore in public debate. The purpose is to gain in power to survey a current problem in its entire scope with clear demarcation of the essential factors involved. Reports, discussions, lectures and a term paper. First semester. Mr. Hughes

Phil. 171. Readings in Philosophy (2 or 3).

A course of readings in any of the various fields of philosophy, designed for the student who has a special interest in work not covered by any of the regularly rostered courses. Prerequisite: senior standing and the consent of the instructor. First semester. Messrs. Becker, Lafferty

Phil. 172. Readings in Philosophy (2 or 3).

A continuation of Phil. 171. Second semester. Messrs. Becker, Lafferty

For Graduates

Prerequisite to major graduate work in philosophy: four undergraduate courses in philosophy or equivalent preparation.

Phil. 201. History of Philosophy, Advanced (2 or 3).

A study of Aristotle, his predecessors and successors, to Thomas Aquinas. Alternating with Phil. 205. First semester. Mr. Becker

Phil. 202. History of Philosophy, Advanced (2 or 3).

A study of Kant. The development of Kant's own thought. His dependence upon his precursors and his influence upon those who succeeded him. Alternating with Phil. 206. Second semester. Mr. Lafferty

Phil. 205. Plato (2 or 3).

The fundamental principles of Plato's thought, their development in the Platonic writings, and the change in the emphasis given to them in later times. Alternating with Phil. 201. First semester. Mr. Becker

Phil. 206. Spinoza (2 or 3).

The *Emendation* and the *Ethics*. The growth of modern naturalism, Spinoza's contribution to the movement, and the subsequent history of the doctrine. Alternating with Phil. 202. Second semester. Mr. Hughes

Phil. 208. Thesis in Philosophy (2 or 3).

First semester.

Messrs. Hughes, Lafferty, Becker

Phil. 209. Thesis in Philosophy (2 or 3).

Second semester.

Messrs. Hughes, Lafferty, Becker

Phil. 210. The Theory of Knowledge (3).

The problem is approached in terms of the development of individual experience, taking full account of the biological and psychological facts. The chief steps in the development of knowledge, using that term in the broadest sense. The functions of religion, art, science, history, and philosophy. No text is used. A syllabus may be had on application. Second semester.

Mr. Hughes

Phil. 211. The Theory of Education (3).

The ways in which the individual comes to share the funded experience of the group. How we learn is subordinated to the problem of how best to teach. Religious ministration, the press, and other social agencies, whether genuinely educative or crudely propagandist. The effects of home and school instruction in this wider relationship. First semester.

Mr. Hughes

PHYSICAL EDUCATION AND INTRAMURAL SPORTS

ASSISTANT PROFESSOR BARTLETT, Director of Physical Education
PROFESSOR REITER, MESSRS. KANALY AND MAHONEY

The department of physical education and intramural sports has supervision and control of the required recreational physical activities of the student body. The aim of the department is to insure the health and physical development of every student of the University. Facilities for accomplishing this aim are afforded in Taylor Gymnasium, the field house, the two playing levels of Taylor Field, and Lehigh Field.

Each student is given an annual physical examination by the director of the students' health service, assisted by the department of physical education. He is advised as to postural and physical defects.

All students are required to participate in some form of activity under departmental supervision. This requirement calls for two hours a week in the gymnasium or participation, under the oversight of the department, in an organized sport. In the gymnasium, opportunity is offered in the following activities: mass exercises, mass swimming, beginners' swimming, boxing, fencing, apparatus stunts, hand ball, life saving, golf, and athletic dancing. All undergraduate students must swim seventy-five feet

before graduation. Students are encouraged to change their activities whenever it is thought best for their all-round development.

A comprehensive program in intramural sports is sponsored for the student body including fraternity, dormitory, interclass and independent groups in touch football, tennis, soccer, badminton, handball, golf, individual athletics, basketball, swimming, wrestling, track, softball, and recreative games. Students are encouraged to participate in these sports and awards are given for excellence in performance.

Members of the R. O. T. C. Unit substitute one hour of military drill for one of the two hours of required physical education.

Individual exercise is prescribed for the correction of physical and functional defects. Students of this group are carefully examined and individually guided.

The University maintains a well-equipped dispensary for medical treatment. If a student is injured while engaged in any sport he must report as soon as possible to the director of the students' health service.

The department offers special courses of instruction for coaching and teaching physical education.

P.E. 1. Physical Education.

Freshman first semester.

P.E. 2. Physical Education.

Freshman second semester.

P.E. 3. Physical Education.

Sophomore first semester.

P.E. 4. Physical Education.

Sophomore second semester.

P.E. 5. Physical Education.

Junior first semester.

P.E. 6. Physical Education.

Junior second semester.

P.E. 7. Physical Education.

Senior first semester.

P.E. 8. Physical Education.

Senior second semester.

P.E. 23. The Organization and Administration of Physical Education (2).

THEORY. The organization and supervision of physical education programs including the history of physical education systems, the administration of intramural activities, the qualifications of physical educators, the methods of teaching, and the planning of programs. Second semester.

P.E. 24. The Organization and Administration of Physical Education (1).

PRACTICE. The practice of teaching mass physical activities including athletics, combative events, gymnastic games, apparatus stunts, and efficiency tests. Programs of corrective exercises for postural defects are considered. Three hours practice a week. Second semester.

PHYSICS

PROFESSORS BIDWELL, BAYLEY, AND PETERSEN
ASSOCIATE PROFESSORS CARWILE, C. R. LARKIN, AND M. EWING
ASSISTANT PROFESSORS BERGER, FREY, SNAVELY, AND F. A. SCOTT
MESSRS. LANTERMAN, SHIFFERT, STILES, BUERSCHAPER,
BAUMANN AND ALTSHULER

Phys. 12. Introduction to Physics (3).

A survey course for students in the Colleges of Arts and Science and of Business Administration. A brief introduction to the principal fields of physics. Lecture demonstrations, recitations, and laboratory. Fee, \$6.00. First semester.

Phys. 16. General Physics (3).

A continuation of Phys. 12. Lecture demonstrations and recitations. Prerequisites: Phys. 12, Math 1, 1a, or 1b. Second semester.

Phys. 17. General Physics Laboratory (2).

A laboratory course in general physics to accompany Phys. 16. Prerequisites: Phys. 12, Math, 1, 1a, or 1b. Fee, \$10.00. Second semester.

Phys. 22. Mechanics, Properties of Matter and Light (4).

Introduction to mechanics of solids and fluids; properties of matter; optics, with emphasis on those portions of interest to technical students. Two recitations, one lecture, and one laboratory period per week. Fee, \$6.00. First and second semesters.

Phys. 23. Dynamics and Heat (4).

Dynamics of point masses and rigid bodies; mechanics of elasticity, wave-motion and sound; heat, with emphasis on the mechanical theory. Two recitations, one lecture, and one laboratory period per week. (The calculus is employed in this course). Prerequisite: *Math. 13, previously or concurrently*. Fee, \$6.00. First and second semesters.

Phys. 24. Electricity and Magnetism (4).

Ohm's law, electric and magnetic fields, electromagnetism, induced electromotive forces, etc. Two recitations, one lecture and one laboratory period per week. (The calculus is employed in this course). Prerequisite: *Math. 13, previously or concurrently*. Fee, \$6.00. First and second semesters.

Phys. 50. Industrial Employment.

Eight weeks industrial employment during the summer, following the junior year with submission of a written report.

For Advanced Undergraduates and Graduates

Phys. 110. Electrical Laboratory (1).

Precise measurements. Prerequisite: *Phys. 24*. Fee, \$6.00. First semester. Messrs. Larkin, Snively

Phys. 111. Electrical Laboratory (1).

Precise measurements. Continuation of *Phys. 110*. Prerequisites: *Phys. 24; Phys. 110*. Fee, \$6.00. Second semester. Messrs. Larkin, Snively

Phys. 120. Electric Oscillations and Electric Waves (3).

Electric oscillations and waves and high frequency phenomena. One laboratory and two class periods a week. Prerequisites: *Math. 13, Phys. 23 and 24, or 16; Phys. 110, 162*. Fee, \$6.00. Second semester. Mr. Frey

Phys. 122. Physical Optics and Spectroscopy (3).

The wave theory of light, interference, diffraction, polarization, etc.; exposition of some phases of spectroscopic phenomena. One laboratory and two class periods a week. Prerequisite: *Math. 13; Phys. 23 and 24, or 16; 110, 162*. Fee, \$6.00. First semester. Mr. Berger

Phys. 124. Electrical Discharge through Gases (3).

Properties of gaseous ions, the experimental data leading to the electron theory, including a study of vacuum tube phenomena, ionization and resonance potentials, photo-electricity, etc. One laboratory, and two class periods a week. Prerequisites: *Math. 13, Phys. 23 and 24, or 16; Phys. 110, 162*. Fee, \$6.00. First semester. Mr. Frey

Phys. 126. Pyrometry (3).

High and low temperature measurements. Practical exercises in the use of the thermocouple, the resistance thermometer, the radiation and optical pyrometer, and similar instruments. One laboratory and two class periods a week. Prerequisites: *Math. 13, Phys. 23 and 24, or 16*. Fee, \$6.00. Second semester. Mr. Berger

Phys. 140. Teaching of Physics in Secondary Schools (3).

The aims, methods, and content of a secondary school course in physics. Various physics syllabi are used as an outline. Review of a standard text with simple demonstrations. Examination of standard laboratory manuals and performance of selected experiments. Discussion of modern

physical theories. Open only to teachers or prospective teachers of high school physics. Four conferences and two laboratory periods per week. Summer session. Mr. Scott

Phys. 150. Geophysics (3).

The application of physical measurements to the study of geologic structures. The seismic method. For advanced students in geology, mining, and physics. One laboratory period and two lectures each week. Prerequisites: *Phys. 23 and 24, or 16, Math. 13*; *Geol. 10*; *Geol. 1*. Fee, \$6.00. First semester. Mr. Ewing

Phys. 151. Geophysics (3).

Continuation of Phys. 150. Theory and field work in gravitational, magnetic, and electric methods with emphasis on the use of the torsion balance, the dip needle, and the method of equipotentials. Fee, \$6.00. Second semester. Mr. Ewing

Phys. 160. Introduction to Modern Physical Theories (3).

Recent developments, including Maxwell's field equations, photoelectricity, radiation, the quantum theory, relativity, and the structure of the atom. Prerequisites: *Math. 13, Phys. 23 and 24, or 16*. First semester. Mr. Bidwell

Phys. 161. Introduction to Modern Physical Theories (3).

Continuation of Phys. 160. Prerequisites: *Math. 13, Phys. 23 and 24, or 16*; *Phys. 160*. Second semester. Mr. Bidwell

Phys. 162. Introductory Theory of Electricity and Magnetism (3).

Magnetic fields and potentials; electrostatic fields, potentials and capacities; the Maxwell-Thomson theory of lines of force; electromagnetic fields; variable and alternating currents. Prerequisites: *Math. 13, Phys. 24 or 16*. First semester. Mr. Carwile

Phys. 163. Introductory Theory of Electricity and Magnetism (3).

Continuation of Phys. 162. Prerequisites: *Math. 13, Phys. 24 or 16*; *Phys. 162*. Second semester. Mr. Carwile

Phys. 164. Advanced Laboratory (1 or 2).

Laboratory work of research type. Special problems assigned and the student placed largely on his own initiative. Prerequisite: senior standing in engineering physics. Fee, \$6.00. First semester. Mr. Bayley

Phys. 165. Advanced Laboratory (1 or 2).

Continuation of Phys. 164. Prerequisite: senior standing in engineering physics. Fee, \$6.00. Second semester. Mr. Bayley

Phys. 170. Spectroscopy (2 or 3).

The interpretation of the findings of modern spectroscopy. A choice will be made from the various divisions of spectrum analysis such as

excitation of spectra by impacts, hyper-fine structure, spectra of isotopes, band spectra and molecular constants, Raman spectra, spectrographic means of analysis. The method for obtaining data will be illustrated in laboratory problems. Two class periods per week and one optional laboratory period per week. Students desiring the laboratory work will register for three credits. Second semester. Mr. Petersen

For Graduates

The election of purely graduate courses in physics should ordinarily be preceded by such study of the particular field as that presented in courses in the 100 group. A thorough knowledge of the differential and integral calculus is presupposed and further accompanying study of mathematics is generally advisable.

Math. 219 and 220, Selected Topics in Quantum Mechanics and Relativity, and E.E. 209 and 210, Radio Communication, may be included in a graduate major in physics.

Phys. 201. Kinetic Theory (3).

The classical considerations of the kinetic theory of gases substantially as in Boltzmann with additional applications to electrical phenomena. First semester. Mr. Petersen

Phys. 202. Thermodynamics (3).

A course devoted principally to classical thermodynamics following Planck. Second semester. Mr. Petersen

Phys. 207. Theory of Light (3).

The propagation of light, interference, diffraction; the measurement of wave-length, crystal optics; introduction of quantum theories of the interpretation of spectra. This course follows Shuster and Nicholson's *Theory of Optics*. First semester. Mr. Berger

Phys. 208. Theory of Light (3).

Continuation of Phys. 207. Second semester. Mr. Berger

Phys. 214. Quantum Mechanics (3).

Brief historical description of present theory. Applications to simple problems. Perturbation methods. Calculation of energy levels and spectral intensities. Quantum theory of collision processes and of radiation. Nuclear quantum mechanics. First or second semester. Mr. Snively

Phys. 216. Theory of X-rays (3).

The theory of the production and properties of X-rays; reflection, scattering, and dispersion of X-rays, crystal structure determination; X-ray spectra; ejection of electrons. First or second semester. Mr. Bayley

Phys. 220. Theoretical Physics (3).

The methods of mathematical and theoretical physics. The subject matter covered in this course and in Phys. 221, 222, and 223 is that

generally considered necessary for more detailed work in special fields. Required of all candidates for the doctorate. First semester. Mr. Larkin

Phys. 221. Theoretical Physics (3).

Continuation of Phys. 220. Prerequisite: Phys. 220. Second semester. Mr. Larkin

Phys. 222. Advanced Theoretical Physics (3).

A continuation of Phys. 220 and 221. Required of all candidates for the doctorate. Prerequisite: Phys. 221 or equivalent. First semester. Mr. Petersen

Phys. 223. Advanced Theoretical Physics (3).

Continuation of Phys. 222. Prerequisite: Phys. 222. Second semester. Mr. Petersen

Phys. 226. Nuclear Physics (3).

Radioactive transformations; properties of alpha, beta, and gamma rays; neutrons, positrons, cosmic rays; nuclear transformations and methods of producing them. First or second semester. Mr. Scott

Phys. 228. Physics of the Earth (3).

The figure of the earth; its physical constitution and thermal condition; the causes of mountain building and the nature of isostasy. The course, is based on "The Earth" by H. Jeffreys. First semester. Mr. Ewing

PSYCHOLOGY

PROFESSOR FORD, ASSOCIATE PROFESSOR GRAHAM
ASSISTANT PROFESSOR JENKINS
DRS. HOFFMAN AND KLOPP (LECTURERS)

Psych. 1. Elementary Psychology (3).

The principles of human behavior and the methods of investigation. A foundation course for all students taking further psychology. Two lectures and two hours of laboratory each week. First and second semesters.

Psych. 15. Industrial Psychology (3).

The principles of human behavior in the industrial environment. One lecture, one discussion section, and two hours of laboratory each week. Prerequisite: Psych. 1. Second semester.

Psych. 16. Psychology in Business (3).

Psychological problems involved in advertising and selling, sales personnel, and psychology from the standpoint of the consumer. Prerequisite: Psych. 1. Second semester.

Psych. 51. Readings in Psychology (2 or 3).

Readings on organized topics selected after consultation with staff members. Prerequisite: Psych. 1. First and second semesters.

For Advanced Undergraduates and Graduates

Psych. 101. Psychology of Industrial Personnel (3).

Review of the literature on industrial personnel research. Prerequisites: Psych. 1 and 15, or graduate standing. First semester. Mr. Ford

Psych. 102. Aptitude Testing (3).

The predictive measurements of individual differences, concepts, techniques, and materials necessary to understand the selection and guidance problems. Prerequisite: Psych. 1. Not given in 1941-42. First semester. Mr. Graham

Psych. 104. Social Psychology (3).

A psychological interpretation of social phenomena. Prerequisite: Psych. 1 First semester. Mr. Graham

Psych. 108. Genetic Psychology (3).

The genesis, growth, and development of psychological processes and the bearing of the chief developmental changes upon behavior tendencies. Prerequisite: Psych. 1. Not given in 1942-43. First semester. Mr. Graham

Psych. 109. Abnormal Psychology (3).

Gross maladjustive patterns and deviations in individual and societal behavior. Lectures, discussions, and clinical observations in the psychopathic hospital. Prerequisite: Psych. 1. Second semester. Mr. Graham

Psych. 110. Learning and Motivation (3).

A systematic approach to these basic psychological processes and problems. Prerequisite: Psych. 1. Not given in 1942-43. Second semester. Mr. Graham

Psych. 111. Minor Research (2 or 3).

Assigned problems for investigation. Prerequisites: Psych. 1 and consent of the head of the department. First and second semesters. Messrs. Ford, Graham, Jenkins

Psych. 112. Minor Research (2 or 3).

Either a continuation of Psych. 111 or a different problem for investigation. Prerequisites: Psych. 1 and consent of the head of the department. First and second semesters. Messrs. Ford, Graham, Jenkins

Psych. 117. Personality (3).

A psychological interpretation of personality, its development, determinants, analysis, and relationship to successful adjustment. Prerequisites: Psych. 1 and junior standing. Second semester. Mr. Graham

Psych. 131. Neurological Aspects of Behavior (1).

Laboratory work and discussions concerning such phases of the structure and function of the nervous system as are of particular interest in the study of psychology. Prerequisite: Psych. 1. Not given in 1941-42. First semester. Mr. Ford

Psych. 132. Sensory Psychology (2).

Laboratory work and discussions covering the various sensory processes from both theoretical and experimental viewpoints. One hour discussion and two hours of laboratory work each week. Prerequisite: Psych. 1. Not given in 1941-42. First semester. Mr. Jenkins

Psych. 133. Complex Psychological Processes (3).

Laboratory work involving apparatus techniques for the study of selected phases of attention, perception, learning, and emotion. Six hours of laboratory work per week. Prerequisite: Psych. 1. Not given in 1942-43. First semester. Messrs. Ford, Jenkins

For Graduates

Psych. 203. Seminar in General Psychology (3).

Some significant aspect in psychological theory or principle, but varied from year to year in accordance with students' needs. Not given in 1942-43. First semester. Messrs. Ford, Graham

Psych. 204. Seminar in General Psychology (3).

Either a continuation of Psych. 203 or a new topic. Not given in 1941-42. Second semester. Messrs. Ford, Graham

Psych. 205. Seminar in Applied Psychology (3).

Some significant applications in psychology, but the topic will vary from year to year in accordance with students' needs. Not given in 1941-42. First semester. Messrs. Ford, Graham

Psych. 206. Seminar in Applied Psychology (3).

Either a continuation of Psych. 205 or a new topic. Not given in 1942-43. Second semester. Messrs. Ford, Graham

Psych. 209. Systematic Psychology (3).

A critical approach to the methods, evidence, and theories of psychology; the building of an organization of basic principles. Not given in 1941-42. First semester. Mr. Ford

Psych. 210. Systematic Psychology (3).

A continuation of Psych. 209. Prerequisite: Psych. 209. Not given in 1941-42. Second semester. Mr. Ford

Psych. 211. Major Research (3).

Assigned problems for investigation on a graduate level. First and second semesters. Messrs. Ford, Graham

Psych. 212. Major Research (3).

Either a continuation of Psych. 211 or a new problem. First and second semesters. Messrs. Ford, Graham

PUBLIC SPEAKING

See English, Speech

ROMANCE LANGUAGES

PROFESSOR BARTHOLD
ASSISTANT PROFESSORS SOTO AND ROBERTS
MESSRS. D. G. SCOTT, FARNÉ, AND McNERNEY

Fr. 1. Elementary French (3).

First semester.

Fr. 2. Elementary French (3).

Continuation of Fr. 1. Prerequisite: Fr. 1. Second semester.

Fr. 11. Intermediate French (3).

Reading based on works of 19th and 20th century writers. Formal review of French grammar with prose composition. Outside reading. Prerequisite: *one year of college French or entrance French A*. First semester.

Fr. 12. Intermediate French (3).

Continuation of Fr. 11. Prerequisite: Fr. 11. Second semester.

Fr. 13. Types of French Literature (3).

Training in the ability to read and understand representative works from the seventeenth century to the present day. Accurate translation of texts of graded difficulty. Rapid reading and discussion of other works. Prerequisites: Fr. 11 and 12, or three years of preparatory school French. First semester.

Fr. 14. Types of French Literature (3).

Continuation of Fr. 13. Prerequisite: Fr. 13. Second semester.

Fr. 21. Seventeenth Century French Literature (3).

The age of classicism. Lectures, study of texts, collateral readings, and reports. Prerequisites: Fr. 13 and 14. First semester.

Fr. 22. Eighteenth Century French Literature (3).

Follows Fr. 21. The rise of liberalism as reflected in the writings of Montesquieu, Diderot, Rousseau, and Voltaire. Prerequisites: Fr. 13 and 14. Second semester.

Fr. 31. Nineteenth Century French Literature (3).

Main literary currents of the nineteenth century: romanticism and realism. Lectures, reports, collateral readings. Prerequisites: Fr. 13 and 14. First semester.

Fr. 32. Nineteenth Century French Literature (3).

Continuation of Fr. 31. Prerequisite: Fr. 31.

Fr. 41. French Oral and Written Composition (3).

For students who wish a greater opportunity for practice in the oral and written use of modern French. Prerequisites: Fr. 13 and 14. First semester.

Fr. 42. French Oral and Written Composition (3).

Continuation of Fr. 41. Prerequisite: Fr. 41. Second semester.

For Advanced Undergraduates and Graduates

Fr. 101. French Literature before the Seventeenth Century (3).

A general review of French literature from its beginning through the 16th century. Prerequisites: Fr. 31 and 32, or the equivalent. First semester. Mr. Roberts

Fr. 102. Contemporary French Literature (3).

Prerequisites: Fr. 31 and 32, or the equivalent. Second semester. Mr. Farné

Fr. 103. Proseminar (3).

A study of the works of some author or group of authors or of a period. Prerequisites: Fr. 31 and 32, or the equivalent. First semester. Mr. Barthold

Fr. 104. Proseminar (3).

Continuation of Fr. 103. Second semester. Mr. Barthold

For Graduates

Prerequisite: graduate students who major in French must have completed not less than twelve semester hours of French language and literature above the standard intermediate courses. A reading knowledge of Latin and German is desirable; a general knowledge of English literature is required; a thorough acquaintance with Latin grammatical forms is essential for Fr. 201 and 202.

Fr. 201. Old French (3).

First semester. Mr. Barthold

Fr. 202. Old French (3).

Continuation of Fr. 201. Second semester. Mr. Barthold

Fr. 203. French Literature of the Renaissance (3).

First semester. Mr. Roberts

Fr. 204. French Literature of the Renaissance (3).

Continuation of Fr. 203. Second semester. Mr. Roberts

Fr. 211. The History of the Novel in France (3).

Reading of representative works of different periods and analysis of the growth of the novel as a literary form. First semester. Mr. Barthold

Fr. 212. The History of the Novel in France (3).

Continuation of Fr. 211. Second semester. Mr. Barthold

Fr. 213. Modern French Poetry (3).

A history of French poetry from the Parnassian school to the present day. First semester. Mr. Farné

Fr. 214. Contemporary French Theater (3).

A history of the contemporary French theater from the *Théâtre libre* to the present day. Second semester. Mr. Farné

SPANISH

Span. 1. Elementary Spanish (3).

First and second semesters.

Span. 2. Elementary Spanish (3).

Continuation of Span. 1. Prerequisite: Span. 1. First and second semesters.

Span. 11. Intermediate Spanish (3).

Reading of modern Spanish prose, with the view of acquiring exactness and speed in reading. Rapid review of grammar with prose composition. Prerequisite: *one year of college Spanish or entrance Spanish A*. First semester.

Span. 12. Intermediate Spanish (3).

Continuation of Span. 11. Prerequisite: Span. 11. Second semester.

Span. 21. Spanish Novels and Plays (3).

Reading and discussion of selected texts. Outside reading and reports. Prerequisites: Span. 11 and 12. First semester.

Span. 22. Spanish Novels and Plays (3).

Continuation of Span. 21. Prerequisite: Span. 21. Second semester.

Span. 31. Spanish Oral and Written Composition (3).

For students who wish a greater opportunity for practice in the oral and written use of modern Spanish. Prerequisite: *consent of the head of the department*. First semester.

Span. 32. Spanish Oral and Written Composition (3).

Continuation of Span. 31. Second semester.

For Advanced Undergraduates and Graduates

Span. 101. Spanish Fiction of the Sixteenth and Seventeenth Centuries (3).

The novel of the Golden Age with special attention to Cervantes' *Don Quixote*. Collateral reading and reports. Prerequisites: Span. 21 and 22. First semester. Mr. McNerney

Span. 102. Spanish Drama of the Sixteenth and Seventeenth Centuries (3).

Selected plays by Lope de Vega, Tirso de Molina, and Calderón. Collateral reading and reports. Prerequisites: Span. 21 and 22. Second semester. Mr. McNerney

Span. 103. Proseminar (3).

A study of the works of some author or group of authors or of a period. Prerequisites: Span. 21 and 22. First semester. Mr. McNerney

Span. 104. Proseminar (3).

Continuation of Span. 103. Second semester.

Mr. McNerney

Span. 111. Spanish-American Literature (3).

Brief survey of the whole field of Spanish-American literature, with emphasis on works of modern writers. Prerequisites: Span 21 and 22. First semester.

Mr. Soto

Span. 112. Spanish-American Literature (3).

Continuation of Span. 111. Second semester.

Mr. Soto

For Graduates

Prerequisite: Graduate students who major in Spanish must have completed not less than twelve semester hours of Spanish language and literature above the standard intermediate courses. A reading knowledge of Latin and French is desirable.

Span. 201. Old Spanish (3).

First semester.

Mr. Soto

Span. 202. Old Spanish (3).

Continuation of Span. 201. Second semester.

Mr. Soto

Span. 211. The Modern Spanish Novel (3).

Reading, reports, and lectures. First semester.

Mr. Soto

Span. 212. The Modern Spanish Novel (3).

Continuation of Span. 211. Second semester.

Mr. Soto

ITALIAN

Ital. 1. Elementary Italian (3).

Grammar and composition, rapid reading of easy modern prose. First semester.

Ital. 2. Elementary Italian (3).

Continuation of Ital. 1. Prerequisite: Ital. 1. Second semester.

Ital. 11. Intermediate Italian (3).

The age of Dante. Lectures and readings in the *Divina Commedia*. Given in English. Prerequisites: Ital. 1 and 2. First semester.

Ital. 12. Intermediate Italian (3).

Continuation of Ital. 11. Second semester.

SOCIOLOGY

See Economics and Sociology

SPANISH

See Romance Languages

SPEECH

See English

STATISTICS

See Accounting

DIVISION OF INTERCOLLEGIATE ATHLETICS

DIRECTOR HARMESON

MESSRS. KANALY, SHERIDAN, CALVERT, WESTERMAN, MORRISSEY,
CARPENTER, MERCUR, SHORT, McCAA, HEINS

The division of intercollegiate athletics offers opportunity to the undergraduate student body to participate in intercollegiate competition both at home and abroad with institutions which are Lehigh's natural rivals and also other institutions which are at some distance.

The intercollegiate program consists of freshman and varsity teams in football, soccer, wrestling, basketball, swimming, tennis, track, and baseball, as well as a varsity team only in cross country.

General Information

SUMMER SESSION

The various courses given during the summer are administered by the director of the summer session and a faculty consisting of those teaching in the summer session. All courses are conducted in accordance with the same standards, and may be credited toward a degree on the same basis, as courses given in the first and second semesters. Women are admitted to the summer session either as graduate or as undergraduate students on the same terms as men. Certificates of academic credit are issued, on request, for all courses satisfactorily pursued.

The courses offered during the summer session are arranged in four distinct groups: (1) courses which are an integral part of certain engineering curricula; (2) courses in a variety of subjects offered primarily for undergraduates who wish to secure advanced credits or to make up deficiencies; (3) professional courses designed primarily for teachers; (4) courses offered primarily for graduates who wish to secure advanced degrees.

The following courses were offered in the summer of 1940. The summer session announcement, containing a full description of courses to be offered in 1941, and information concerning admission, fees, etc., will be sent to any address, on request to the director of the summer session.

REQUIRED COURSES IN ENGINEERING

June 3 to 29

Chem. 39	Assaying, Coal, Oil, and Gas Analysis.....	(4)
C.E. 6	Land and Topographic Surveying.....	(4)
M.E. 24	Engineering Laboratory	(4)

September 4 to 18

C.E. 31	Route Surveying	(2)
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OPTIONAL COURSES

July 1 to August 10

Biol. 1	Biology	(3)
Biol. 106	Natural History and Ecology.....	(3)
Biol. 267	History of Bacteriology.....	(3)
Acctg. 4	Accounting for Engineers.....	(3)
Eco. 3	Economics	(3)
Eco. 4	Economics	(3)
E.S. 145	Statistical Method	(3)
Fin. 25	Corporation Finance.....	(3)
Fin. 136	Public Utilities	(3)
Fin. 171	Readings in Finance	(3)
Fin. 172	Readings in Finance	(3)

Chem. 1	Elementary Chemistry.....	(2)
Chem. 8	Stoichiometry	(1)
Chem. 11	Chemistry Laboratory	(2)
Chem. 20	Elementary Chemistry and Qualitative Analysis.....	(3)
Chem. 22	Semi-Micro-Qualitative Analysis	(3)
Chem. 99	Research Chemistry Laboratory.....	(2)
Chem. 145	Radiation Methods Laboratory.....	(1)
Chem. 150	Organic Chemistry.....	(3)
Chem. 151	Organic Chemistry.....	(3)
Chem. 167	Organic Chemistry Laboratory.....	(2)
Chem. 201	Inorganic Chemistry Research	(4)
Chem. 260	Organic Chemistry Research.....	(4)
Chem. 266	Advanced Organic Preparations.....	(2)
Chem. 281	Industrial Chemistry and Chemical Engineering Research	(4)
Chem. 290	Physical Chemistry Research	(4)
C.E. 1	Engineering Drawing	(2)
C.E. 2	Engineering Drawing	(2)
C.E. 8	Mechanics of Materials.....	(4)
C.E. 9	Mechanics of Materials.....	(3)
C.E. 12	Hydraulics	(3)
C.E. 13	Hydraulics	(2)
Educ. 171	Elementary Educational Statistics.....	(3)
Educ. 190	Visual Instruction.....	(3)
Educ. 222	Education of Exceptional Children.....	(3)
Educ. 253	Secondary School Administration	(3)
Educ. 263	Public School Administration.....	(3)
Educ. 264	Foundations of Curriculum Construction.....	(3)
Educ. 272	Educational Tests and Measurements.....	(3)
Educ. 293	Individual Research.....	(3)
Educ. 294	Individual Research.....	(3)
E.E. 2	Direct-Current Machinery.....	(3)
E.E. 4	Alternating Currents, Elementary.....	(3)
E.E. 5	Dynamo Laboratory, Intermediate.....	(1)
E.E. 50	Dynamos and Motors, General.....	(2)
E.E. 51	Dynamo Laboratory, Beginning.....	(1)
E.E. 52	Alternating Currents, General.....	(2)
E.E. 53	Dynamo Laboratory, Intermediate.....	(1)
Engl. 1	Composition and Literature.....	(3)
Engl. 2	Composition and Literature.....	(3)
Engl. 41	Business Letters.....	(3)
Engl. 124	Shakespeare	(3)
Engl. 126	English Literature of the Victorian Era.....	(3)
Engl. 220	Graduate Seminar.....	(3)
Journ. 1-8	Brown and White.....	(1)
Speech 161	Dramatics	(3)
F.A. 14	The Development of Modern Painting.....	(3)
Geol. 4	General Geology.....	(2)
Geol. 6	Geology Laboratory and Field Trips.....	(1)
Geol. 8	Historical Geology	(3)

GENERAL EDUCATION

Ger. 1	Elementary German.....	(3)
Ger. 2	Elementary German.....	(3)
Ger. 4-7	Intermediate German	(3)
Hist. 26	European History	(3)
Hist. 122	England Under Elizabeth.....	(3)
Hist. 160	History of American Political Parties.....	(3)
Hist. 218	America as a World Power.....	(3)
Math. 1	Trigonometry	(3)
Math. 11	Algebra and Analytic Geometry.....	(3)
Math. 12	Analytic Geometry and Calculus.....	(3)
Math. 13	Calculus	(3)
Math. 14	Intermediate Calculus.....	(3)
Math. 16	Solid and Spherical Geometry and Spherical Trigonometry	(3)
Math. 20	Elementary Mechanics.....	(4)
Math. 40	Elementary Mathematics of Finance	(3)
Math. 101	Vector Analysis.....	(3)
Math. 106	Advanced Calculus.....	(3)
M.E. 4	Elementary Machine Design.....	(3)
M.E. 5	Heat Engines.....	(3)
Met. 201	Metallurgical Investigation and Thesis.....	(3)
Phil. 3	Introduction to Philosophy.....	(3)
Phys. 12	Introduction to Physics.....	(3)
Phys. 22	Mechanics, Properties of Matter and Light.....	(4)
Phys. 23	Dynamics and Heat.....	(4)
Phys. 24	Electricity and Magnetism.....	(4)
Psych. 1	Elementary Psychology.....	(3)
Psych. 16	Psychology in Business.....	(3)
Fr. 1	Elementary French	(3)
Fr. 2	Elementary French	(3)
Sp. 1	Elementary Spanish.....	(3)
Sp. 2	Elementary Spanish.....	(3)

PROGRAM IN GENERAL EDUCATION

A program in general education, inaugurated in 1936, provides an opportunity for those students who desire to read either for the purpose of broadening their range of intellectual interests or to pursue some special line of reading not available in regular classroom instruction. Students participating in this program are afforded an opportunity to discuss not only their reading but also their intellectual problems in general with a faculty adviser with whom they come to feel a personal relationship. The independent pursuit of knowledge and the intellectual self-development of the student comprise the aim of the program.

The advisory council for general education, consisting of a group of faculty members with special aptitude for this work, is

in charge of the program in general education. Each year the council formally invites the members of the freshman class to apply for enrollment in the program, but any student in the University may at any time apply to the chairman of the council for admission. No university credit toward a degree is allowed for this work and there are no regular hours or assignments. The conduct of the work is entirely at the direction of the student and his faculty adviser. Only those students, however, who appear able to profit by the program are admitted.

There is no fee in connection with the work of the program in general education.

RELIGIOUS OBSERVANCES

Chapel

Voluntary devotional exercises are held at stated times in Packer Memorial Church. Opportunity is given groups of students to arrange chapel programs in conformity with their accustomed modes of religious observance and worship. Any group of students who are members and adherents of any recognized Christian faith may arrange, under the general supervision of the university chaplain, either regular or occasional religious exercises in Packer Memorial Church for themselves and such others as may desire to attend. These assemblies may be held at any appropriate time when those interested may be free to attend and when the church may not be occupied by regular university or other exercises previously scheduled. The university chaplain is glad to cooperate with any such group in making arrangements.

STUDENTS' HEALTH SERVICE

The students' health service has general charge of all health and sanitary measures in the University. The work of the department is organized under four heads: sanitation, physical examinations, dispensary service, education.

SANITATION. The director of the health service is in direct charge of the sanitation of university buildings and grounds, and exercises such supervision as is possible over other accommodations for students.

PHYSICAL EXAMINATIONS. Each student is required to undergo a complete physical examination each year. This examination,

which is made jointly by the health service and the department of physical education, serves the needs of both these departments and also complies with the requirements of the Reserve Officers' Training Corps. All physical defects and departures from normal are noted, and the students are divided into groups as follows: (1) those who present no abnormalities and who can proceed with the regular mental and physical work of the University, (2) those who are subnormal rather than abnormal and who should be brought up to normal by the regular courses in physical education, (3) those who require special or corrective treatment.

Students who fall into groups 2 and 3 are observed at regular intervals, and every effort is made to bring them up to the highest degree of physical development and health. Individual records are kept of the progress of each case.

DISPENSARY SERVICE. The health service maintains a dispensary in Saucon Hall where students may receive treatment for minor illnesses and injuries. The dispensary hours are from 8:30 a.m. to 12:00 m. on all week days, from 1:30 to 5:00 p.m. on week days except Saturday, and from 10:00 a.m. to 12:00 m. on Sunday. A physician and a nurse are on duty in the dispensary during these hours. While the health service does not furnish medical attendance to students who are sick in their rooms, the director keeps in touch with such cases by telephone and otherwise in so far as is possible in order to see that the students are receiving proper attention and that the time lost from university work is minimized. It is requested that all such cases, together with the names of the attending physician, be reported to the director in order that complete records of the health of the students may be kept.

EDUCATION. A course in personal and social hygiene is given to freshmen under the joint responsibility of the health service and the department of biology. In this course emphasis is laid on those points of personal hygiene most applicable to the student recently deprived of the atmosphere and influences of home. In social hygiene an effort is made to disseminate correct information concerning the history and present status of social diseases and the effectiveness of approved methods for the relief of existing conditions. This phase of the health service constitutes a specific part of the general program of instruction recommended by the State Board of Health and by other recognized organizations for the promotion of social hygiene.

PLACEMENT BUREAU

The University maintains a placement bureau for the performance of three major functions: student part-time aid, senior placement, and alumni placement.

Although the bureau does not guarantee employment, it is ready to aid students and alumni in every possible way to secure desired work.

STUDENT PART-TIME AID. Students who are in need of financial assistance are aided in securing employment on the campus and in the community. Through the cooperation of the faculty and the local merchants, many of the students are able to continue their courses in college, which would not be possible without such aid from the placement bureau.

Seldom can a student, even though he possess unusual mental capacity and physical vigor in addition to extraordinary industry, hope to earn all of his expenses. Even with provision for his tuition, such a student will find it difficult to earn enough to care for his other expenses. An extensive money-earning program is a mistake unless it is absolutely necessary, but a modest program is possible for those students who have determination and the willingness to endure the hardships which accompany such a program.

SENIOR PLACEMENT. During the second semester the placement bureau and the directors of curricula receive the personnel representatives of many industries and business houses, on the campus. These representatives are provided with facilities for interviewing seniors, with the result that a large portion of the seniors secure positions which they assume upon graduation.

In addition to securing interviews on the campus for seniors, many interviews are arranged for them at the offices of companies which do not send personnel representatives to the campus.

The work of the placement bureau does not cease at commencement time, but continues all year. The combined efforts of the placement bureau, the directors of curricula, and the seniors themselves, result yearly in the placement of practically all graduating seniors who seek employment.

ALUMNI PLACEMENT. The placement bureau acts as a clearing house for the placement of alumni who are seeking employment or better positions. During the course of the year, many alumni find employment through this service.

FINANCIAL AID

SCHOLARSHIPS AVAILABLE TO FRESHMEN

I. Competitive Regional Scholarships

1. Lehigh University offers each year ten competitive scholarships valued at \$1600 each for four years of college work. These scholarships cover tuition in the College of Arts and Science, the College of Business Administration, or the College of Engineering. The scholarships once assigned will continue in force for the full four years of the student's residence at Lehigh University, unless he shall fail to meet the scholastic average of 2.50 or better and the social qualifications of a good student. These scholarships are given strictly on merit and irrespective of need for financial aid.

2. In order to compete for one of these scholarships, a freshman candidate must take the following steps:

(a) Write a letter to the office of admissions, Lehigh University, Bethlehem, Pennsylvania, indicating his intention to compete, and requesting a form on which to submit his application. The application should be received by the office of admissions before March 1 of the calendar year in which the applicant expects to enter Lehigh University.

(b) Submit a satisfactory record of his secondary school preparation, which must meet all entrance requirements for the particular college he wishes to enter. A preliminary record must be submitted, on forms which will be provided, as soon as possible after the close of the first semester of the senior or final year of secondary school preparation.

(c) Submit on the form provided a complete record of his secondary school extracurricular activities, to which should be added information regarding any important piece of creative work, independent study, or other notable accomplishments which do not appear in his regular record submitted for admission. His guidance officer must attest the accuracy of this record.

(d) Ask his principal or headmaster to send to the office of admissions, Lehigh University, a general character recommendation and a general estimate of his fitness to do college work.

(e) Compete in certain examinations offered under the auspices of the College Entrance Examination Board, namely, a Scholastic Aptitude Test and a Scholastic Achievement Test. (In 1941 these tests will be given on Saturday, April 5.)

Awards will be made in the order of the contestants' ratings on such weighted factors as preparatory school scholastic record, evidences of effective leadership and distinguished group service, character and personality, and performance in the competitive examinations, the last factor being the most heavily weighted. Awards will be assigned geographically, two each to the New England States and the Middle Atlantic States, three to the South-eastern States, and three at large. However, if in any year the winning candidate or candidates in some area do not show a total weighted rating reasonably commensurate with the ratings of runners-up in other geographical divisions, one or more of the awards to that area may lapse for that year and be assigned to superior candidates from other geographical divisions.

Further details regarding the taking of the examinations and the records to be submitted will be forwarded to applicants upon request.

Address all communications to the office of admissions, Lehigh University, Bethlehem, Pennsylvania.

II. Scranton Public High Schools Scholarships

Four scholarships, provided through the gifts of friends of Lehigh University, are to be awarded, one each year to graduates of the public senior high schools of Scranton, Pennsylvania, of which there are now two, viz., Central High School and Technical High School. The scholarship is to cover the tuition fee of the holder thereof.

In the event that there should be no satisfactory applicants from any of the public senior high schools of Scranton in any given year, the scholarship for that year may be awarded to any satisfactory applicant residing in Scranton. If there should be no satisfactory applicant from Scranton, the scholarship may be awarded to any worthy applicant regardless of residence.

A scholarship award is to be renewed yearly to the initial holder thereof until he graduates, provided he remains in school and maintains a satisfactory scholastic record.

The following qualifications only are to be the basis of the award of the scholarships: (a) a good character; (b) need of pecuniary assistance; (c) high scholastic ability and qualities of leadership as evidenced by extracurricular activities. The awarding of these scholarships will be administered through the committee on scholarships and loans.

At the discretion of the President, each scholarship may be divided into two or more partial scholarships totaling one full scholarship, so that two or more may benefit by any annual award.

If at any time the income from the funds should warrant, two scholarships may be awarded in one year. If at any time the accumulated income is not sufficient to pay the full amount of the tuition fee, the scholarship shall be awarded nevertheless, the balance being taken from the principal of the fund.

III. General Undergraduate Scholarships

Freshmen are also eligible for the free scholarships and the deferred payment scholarship loans, open to all undergraduates, as described in the following section. Regular interest-bearing loans, as described below, are not available to freshmen or other students matriculating at the University for the first time.

GENERAL UNDERGRADUATE SCHOLARSHIPS AND LOANS

By authority of the board of trustees, a limited number of *free* scholarships are awarded annually to undergraduate students. The usual award amounts to \$200 and is applicable against tuition payments only, giving full and final remission of one-half of each semester's tuition charge—\$112.50 the first semester and \$87.50 the second semester. In exceptional cases an award may be made in the amount of \$400 to meet the full tuition charge.

Deferred payment scholarship loans are also available, either to supplement a free-half-tuition award when the applicant's scholarship rating is sufficiently high and when the economic situation of the applicant's family clearly warrants it; or given independently of any scholarship award as may be determined by the committee on scholarships and loans. For this loan the student signs a note, endorsed by his parents or guardian, binding him to repay the amount of the loan, such payment to begin at the latest within three months after graduation or withdrawal

from the University, in instalments of \$15 per month the first year and \$20 a month thereafter until the debt is liquidated.

The basis of award for both *free scholarships* and *deferred payment scholarship loans* is: (a) financial need; (b) character and personality; (c) high scholastic achievement; (d) leadership qualities and participation in school activities other than scholastic.

(a) The committee on scholarships and loans must be thoroughly convinced that the student is unable to pay his tuition in full or part and that, with the tuition aid granted, the student will be fully able to finance himself for the year with no serious difficulty. The burden of positive proof on these points is placed on the student. An inquiry form regarding financial status is a part of the application-for-aid form.

(b) Evidence must be presented of excellence of character and personality.

(c) The *minimum* scholastic requirement is, in the case of a freshman, rank in the top third of his graduating class in high school or preparatory school, and in the case of a university sophomore, junior, or senior, an average grade during the previous academic year of 2.00 or better. (Average grades are computed by weighting A as 4, B as 3, C as 2, D as 1, and E and F as 0.)

(d) Other factors being equal, preferential consideration may be given to the student who, in addition to making a meritorious scholastic record, has also been able to demonstrate successful leadership in one or more non-scholastic activities in school or on campus.

A student transferring from another four-year college, unless he has been graduated, is not eligible to apply for a scholarship or deferred payment scholarship loan until he has completed one year at Lehigh University.

A student entering from a recognized junior college with full transferred credits (junior year standing) may be a candidate for a free scholarship or a deferred payment scholarship loan, or both, on his junior college record.

Any scholarship or loan award is for one year only; but a student holding a scholarship or loan in any year may apply on

his record for further award for the following year. Ordinarily his award will be continued unless his scholastic average is below 2.50.

A freshman who barely meets the minimum scholastic standard specified above is qualified to enter competition for financial aid; but funds available are awarded on a competitive basis, and a candidate who does not rank well up in the top fifth of his graduating class, or who has not achieved some distinction in non-academic activity, cannot hope for success in the competition.

In addition to awarding the scholarships and scholarship loans described above, the University makes interest-bearing loans from its endowed loan funds. Except for small amounts in unusual emergencies, such loans are made only to apply toward tuition, in cases of demonstrated need, satisfactory character and personality, and a scholastic record which is considered satisfactory although falling below the standard required for a scholarship award. Loans, other than the deferred payment scholarship loans referred to above, *are not available to new students*—freshmen or transfer students with advanced credit.

The maximum loan to a student with an average below 2.00 but 1.50 or over is \$300, and the maximum loan to a student with an average below 1.50 is \$200. These are loans only for students who have been in the University one or more years.

No loan can be made to a student whose average is below 1.00, or who is on scholastic or disciplinary probation, or who has been in residence less than one year.

The maximum indebtedness to the University which a student may normally be permitted to incur is \$800, i.e., the equivalent of deferred payment scholarship loans of \$200 each year for four years. The absolute maximum in exceptional cases is \$1,000.

Time Limit for Repayment. Every student incurring indebtedness to the University is required to undertake to pay his debt in full within five years after his graduation or withdrawal according to a schedule to be agreed upon. In case of the normal maximum debt of \$800 the payment should be completed within four years, as follows:

First year—12 monthly payments of \$15	\$180
Second year—12 monthly payments of \$20	240
Third year—12 monthly payments of \$20	240
Fourth year—7 monthly payments of \$20	140
	\$800

Interest on Deferred Payment Scholarship Loans. Indebtedness incurred through deferred payment scholarship loans bears no interest so long as the student is in residence. From the date of graduation or withdrawal such indebtedness bears interest at the rate of 2% for the first year, 3% for the second year, 4% the third year, 5% the fourth year, and 6% thereafter.

Interest on Loans. Loans from the loan funds bear interest at 6% from the date of the loan.

Acceptance and Deposit. All students to whom scholarships or loans of any kind are awarded are required to signify within ten days their acceptance of such award and their intention to register in Lehigh University the following September, and to accompany this notice of acceptance and intention with a check or money order for \$25; this amount to be applied at registration against incidental and laboratory fees, but to be non-returnable in case of non-registration.

Application. Candidates for scholarships or loans must make application on forms provided by the committee on scholarships and loans. Candidates not previously enrolled in the University should write for the form to the director of admissions; candidates who have been enrolled in the University one semester or longer should write to the dean of undergraduates. Dates for filing applications are:

1. Before June 1 for freshmen and transfer students from other colleges.
2. Before June 15 for sophomores, juniors, or seniors who have been on the campus for one or more years. Applications for free tuition scholarships and deferred payment scholarship loans *must be received before June 15*, but it is to a candidate's advantage to send in his application for these by May 1. The limited loan funds (bearing interest) are also likely to be exhausted by July 1,

although requests will be received up to September 1, after which date none can be considered. All requests must be based on a budget for the *full academic year*, in order to avoid unanticipated applications for assistance during the second semester, when funds at the disposal of the committee will have been exhausted by commitments for the year.

SCHOLARSHIPS FOR UNDERGRADUATES PREVIOUSLY ENROLLED

The Ray Sands Nostrand Scholarship

The Ray Sands Nostrand Scholarship was established by the late Benjamin B. Nostrand, Jr., M.E. '78, in memory of his son, Ray Sands Nostrand, '17. The income from this fund, amounting to \$350.00 annually, is awarded to students of the University. The requirements governing the award of university scholarships apply likewise to this scholarship.

The Fred. Mercur Memorial Fund Scholarship

Friends of the late Frederick Mercur, of Wilkes-Barre, Pa., General Manager of the Lehigh Valley Coal Company, desiring to establish a memorial of their friendship and esteem, and to perpetuate his memory, contributed and placed in the hands of the trustees of the University a fund called the Fred. Mercur Memorial Fund. The income from this fund, amounting to \$300.00 annually, is awarded to students of the University. The requirements governing the award of university scholarships apply likewise to this scholarship.

The Wilbur Scholarship

The Wilbur Scholarship, founded in 1872 by the late E. P. Wilbur, provides the sum of \$200.00 which is awarded annually to the sophomore with the best record for the sophomore year.

The Henry S. Haines Memorial Scholarship

Mrs. Henry S. Haines, of Savannah, Ga., established in 1889 a scholarship of the annual value of \$100.00 as a memorial to her son, Henry Stevens Haines, M.E. '87. By the terms of the bequest this scholarship is awarded to a student in the curriculum in mechanical engineering. The requirements governing the award of university scholarships apply likewise to this scholarship.

The William S. Cortright Scholarship

Mrs. William S. Cortright established in 1938 a fund, the income from which provides a scholarship of \$175.00 annually in memory of her husband who graduated from Lehigh University in 1872. By the terms of the bequest this money is to be used for the maintenance of a half-tuition scholarship to be awarded to a student who is a resident of Bethlehem or the immediate vicinity and who is enrolled in the curriculum of mechanical engineering. The award is to be made by the committee on scholarships and loans under the regular requirements governing the award of other University scholarships.

The Natt Morrill Emery Scholarship

Established in memory of the late Natt Morrill Emery, vice-president and controller of Lehigh University, by an alumnus and former student of Dr. Emery's, the Natt Morrill Emery Scholarship covers the full tuition fee. It will be awarded by Lehigh University every four years (or whenever it becomes vacant) from 1940 to 1956 inclusive to that graduate of the high schools of Richmond, Virginia, selected by the Richmond school authorities, who during his scholastic career has exemplified in character and conduct the qualities of loyalty and ability which marked the services of Dr. Emery to Lehigh University.

LOAN FUNDS

The Eckley B. Coxe Memorial Fund

In memory of the late Eckley B. Coxe, trustee of the University, Mrs. Coxe established a fund, amounting to \$70,000.00, the interest of which is used, under the direction of the trustees of the University, and subject to such regulations as they may adopt, for the assistance of worthy students requiring financial aid.

The Frank Williams Fund

Frank Williams, B.S., '87, E.M., '88, who died in October, 1900, bequeathed to the University the greater part of his estate to found a fund, now amounting to \$206,000.00, the income of which is lent to deserving students.

The Frazier and Ringer Memorial Fund

The Frazier and Ringer Memorial Fund was established in 1906 by the late Robert H. Sayre, in memory of Benjamin West

Frazier, A.M., Sc.D., former professor of mineralogy and metallurgy, and Severin Ringer, U.J.D., former professor of modern languages and literature and of history, each of whom served Lehigh University for one-third of a century. The income of this fund and payments made by former borrowers are available for loans to cover the medical and surgical care of worthy students.

The President's Fund

The President's Fund was established during the early years of the University for the help of deserving students. As payments are made by former beneficiaries, they are immediately available for the assistance of students of the University.

GRADUATE SCHOLARSHIPS

University Scholarships

The board of trustees has authorized the annual award, to graduate students, of twelve full free scholarships, on the basis of superior qualifications, and twelve deferred payment scholarship loans, on the basis of qualification and need. In general these scholarships are administered under regulations similar to those given above under the heading "General Undergraduate Scholarships and Loans." Inquiries should be addressed to the dean of the Graduate School.

The William C. Gotshall Scholarships

Nine scholarships were provided by a bequest from the late William C. Gotshall for worthy graduate students in any branch or course of engineering offered at Lehigh University. Appointment is for one year with an annual stipend of \$500 with exemption from the university tuition fee. No duties other than graduate study are required of the holders.

ENDOWMENT OF SCHOLARSHIPS

Undergraduate or graduate scholarships named to honor an individual or corporation may be established in perpetuity through the payment to the board of trustees of Lehigh University of \$10,000.00. The income from this donation will be paid to the holder of the scholarship to be applied toward the payment of university fees. The University does not, however, guarantee that this income will be forever sufficient to pay such fees in full.

PRIZES

Owing to the decreased return on invested funds, the income available for payment of prize awards may be insufficient to pay the amounts originally designated and planned by the donor. The University reserves the right to make such adjustments as may be necessary.

The John R. Wagner Award

The John R. Wagner Award was established by the widow of John R. Wagner, Lehigh, 1885, in memory of her husband. The sum of \$15 is awarded on Founder's Day each year to the junior student in mechanical engineering whose scholastic record is the highest in his class in the freshman and sophomore years and whose character and life purposes are deemed deserving and worthy.

The Wilbur Prizes

A fund was established by the late E. P. Wilbur for distribution in prizes as the faculty may determine. This fund yields an annual income of \$100, which is used at present to provide awards as follows:

Wilbur Prizes, Freshman Year—a first prize of \$15 and a second prize of \$10 to the highest ranking and second highest ranking freshman in mathematics; prizes of \$15 each to the highest ranking freshman in English, German, and French.

Wilbur Prizes, Sophomore Year—prizes of \$10 to the highest ranking sophomores in mathematics, English, and physics.

The John B. Carson Prize

An annual prize of \$50.00 was established by Mrs. Helen Carson Turner, of Philadelphia, Pa., in memory of her father, John B. Carson, whose son, James D. Carson, was a graduate of the civil engineering curriculum of Lehigh University in 1876. It is awarded to that senior in civil engineering who shows the most marked excellence in the professional courses of his curriculum.

The William H. Chandler Prizes in Chemistry

Four annual prizes of \$25.00 each, one in each class, for excellence in the curricula in chemistry and chemical engineering, were established by Mrs. Mary E. Chandler, of Bethlehem, Pa.,

widow of Dr. William H. Chandler, who was professor of chemistry at Lehigh University from 1871 until his death in 1906. In memory of Dr. Chandler the faculty named the prizes the William H. Chandler Prizes in Chemistry.

The Electrical Engineering Prize

An annual prize of \$15.00, established by an anonymous graduate of the curriculum in electrical engineering, is awarded to the member of the sophomore class in electrical engineering having made the best record in the work of the sophomore year.

The Philip Francis duPont Memorial Thesis Prize in Electrical Engineering

The Philip Francis duPont Memorial Thesis Prize Fund was established in 1929 by L. S. Horner, E.E., '98. The annual income of this fund, \$150.00, is awarded each year as two prizes of \$100.00 and \$50.00 for the best senior or graduate theses in electrical engineering. If in any year, in the opinion of the department of electrical engineering, no thesis submitted is worthy of the award, the income of the fund is accumulated and added to the fund.

The Horn Prize

The heirs of Harold J. Horn, E.E., '98, established a fund, the income of which is used in the award of two prizes of \$10.00 and \$5.00 for the best work in senior Electrical Engineering Proseminar.

Alumni Prizes

Funds are provided by the alumni association for the annual award of four prizes of \$25.00 each. Two prizes are awarded to the highest ranking juniors in the College of Engineering, one to the highest ranking junior in the College of Arts and Science, and one to the highest ranking junior in the College of Business Administration.

The Williams Prizes in English

The late Professor Edward H. Williams, Jr., an alumnus of the University of the class of 1875, established prizes for excellence in English composition and public speaking. The freshman, sophomore, and junior prizes are awarded by the faculty on the recommendation of the department of English.

SOPHOMORE COMPOSITION PRIZES. A first prize of \$50.00, a second prize of \$25.00, and a third prize of \$15.00 are awarded annually for the three best compositions submitted by sophomores of regular standing as required work in their English courses.

JUNIOR COMPOSITION PRIZES. A first prize of \$50.00, a second prize of \$25.00, and a third prize of \$15.00 are awarded for the three best essays submitted by juniors as part of the required work in their courses in English.

The Williams Senior Prizes

The Williams Senior Prizes are awarded by the faculty on the recommendation of the committee on Williams Senior Prizes.

1. First prizes of \$75.00 and second prizes of \$25.00 are awarded annually in each of the five fields of economics, English, philosophy, psychology, and history and government for dissertations submitted by regular members of the senior class on or before May 1.

2. The committee on Williams Senior Prizes publishes, before the close of the university year, a list of recommended subjects for dissertations, but a senior may submit a dissertation upon any other subject in the respective fields if the subject has received the approval of the committee.

3. Each senior entering the competition shall submit to the committee his choice of subject and plan of work by December 1.

4. The awards are made by the faculty upon recommendation of the committee, but no award is made if in any case a dissertation does not meet the standards of merit established by the committee. This standard includes such points as excellence in thought, plan, development, argument, and composition.

The Williams Prizes in Intramural Debating

Sums totalling \$200 are awarded annually as prizes in intramural debating. Students engaged in this activity are organized under the direction of the department of English into teams, which compete as units in a series of debates held throughout the year. The sum of \$120 is divided equally between the two members of the winning team, the sum of \$80 between the two members of the runner-up. Winners of first prizes may not compete in the next succeeding year.

The Williams Prizes in Extempore Speaking

A first prize of \$50.00 and a second prize of \$25.00 are awarded to freshmen of regular standing who excel in a contest in extempore speaking held in May of each year.

A first prize of \$75.00, a second prize of \$50.00, and a third prize of \$25.00 are awarded annually to the winners in a contest in extempore speaking for juniors and seniors. Winners of first prizes are not eligible to compete in subsequent years.

The Cornelius Prize

The Cornelius Prize of \$100, established by Wm. A. Cornelius, M.E., '89, will be awarded annually to the senior student in mechanical engineering who is judged to have profited most by his opportunities at Lehigh University. The award will be based 70 per cent on scholarship, 20 per cent on attainment in general culture, and 10 per cent on development in personality. To be eligible for the award, a student's scholastic standing must be in the top quarter of the class in the College of Engineering.

The Robert W. Blake Memorial Prizes

The Robert W. Blake Memorial Prizes are awarded at the Founder's Day exercises to freshmen enrolled in the program for general education. The prize committee (for the advisory council for general education) is composed of Professors Palmer, Diamond, and Hughes. The income from the Robert W. Blake Memorial Fund is devoted to the purchase of books awarded as prizes on conditions prescribed by the advisory council for general education.

Scholarship Cups

PHI ETA SIGMA CUP. The Phi Eta Sigma honorary freshman fraternity awards annually a scholarship cup to the living group whose freshmen (not fewer than five) have made the highest scholastic average for the year.

INTERDORMITORY SCHOLARSHIP CUP. The interdormitory council has provided a scholarship cup which is awarded for one year to the dormitory section having the highest scholarship average for the preceding year.

PHI SIGMA KAPPA SCHOLARSHIP CUP. The Phi Sigma Kappa social fraternity has provided a scholarship cup which is awarded for one year to the fraternity in the interfraternity council having the highest scholarship average for the preceding year. The cup

becomes the permanent property of the fraternity winning it for three successive years.

TRUSTEES' SCHOLARSHIP CUP. The trustees of the University have provided a scholarship cup which is awarded for one year to the living group having the highest scholarship average for the preceding year. The trustees' scholarship cup becomes the permanent property of any living group winning it for three successive years.

Prizes Awarded by Student Organizations

TAU BETA PI PRIZE. The Tau Beta Pi honorary engineering fraternity awards a slide rule each year to the technical freshman having the highest scholastic average.

ETA SIGMA PHI PRIZE. The Eta Sigma Phi classical fraternity awards a cash prize of \$10.00 to that student doing the best work in sophomore collegiate Latin.

ALPHA KAPPA PSI MEDALLION. The Alpha Kappa Psi professional fraternity in commerce awards a scholastic medallion each year to the highest ranking junior in the College of Business Administration.

PI TAU SIGMA PRIZES. The Pi Tau Sigma honorary fraternity in mechanical and industrial engineering awards each year a mechanical engineers' handbook to the highest ranking freshmen in the curricula in mechanical engineering and industrial engineering respectively.

ETA KAPPA NU PRIZE. The Eta Kappa Nu honorary fraternity in electrical engineering awards a handbook in electrical engineering to the highest ranking freshman in the curriculum in electrical engineering.

AMERICAN SOCIETY OF CIVIL ENGINEERS JUNIOR MEMBERSHIP PRIZE. The Lehigh Valley Section of the American Society of Civil Engineers offers a prize of a junior membership in the American Society of Civil Engineers to the highest ranking senior in civil engineering holding membership in the student chapter.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS JUNIOR MEMBERSHIP PRIZE. The Anthracite-Lehigh Valley Section of the American Society of Mechanical Engineers awards annually a prize of the value of \$10.00 to an outstanding member of the Lehigh Student Branch of the A. S. M. E. This prize takes the form of junior membership for one year in the parent society.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS STUDENT MEMBERSHIP PRIZE. The Lehigh Valley Section of the American Institute of Electrical Engineers awards annually to a member of the graduating class in electrical engineering, who has given outstanding service to the Student Branch of the AIEE, a prize consisting of a one year student membership in the AIEE.

AMERICAN CHEMICAL SOCIETY AWARD. The Lehigh Valley Section of the American Chemical Society awards a membership in the American Chemical Society and a subscription to a journal of this society to the highest ranking senior in chemistry or chemical engineering.

AMERICAN INSTITUTE OF CHEMISTS MEDAL. The American Institute of Chemists has established annual student medal awards to senior students majoring in chemistry in designated institutions. Each award carries with it a junior membership in the American Institute of Chemists.

HONORS

Honors are of three kinds: graduation honors, class honors, and special graduation honors.

Graduation Honors

Degrees "with honors" are awarded by vote of the faculty to those students who have attained an average of not less than 3.00 in their last two years' work at the University.

Degrees "with high honors" are awarded by vote of the faculty to those students who have attained an average of not less than 3.50 in their last two years' work at the University.

Degrees "with highest honors" are awarded by vote of the faculty to those students who have attained 3.75 in their last two years' work at the University.

Candidates for graduation who have been in residence at the University for less than two years are not eligible for graduation honors.

Graduation honors are announced at the graduation exercises.

In computing the averages of candidates for graduation honors, semester grades are weighted according to the number of credit hours in the course concerned on the basis: A equals 4, B equals 3, C equals 2, D equals 1, and E and F equal 0.

Class Honors

At the close of each year, on recommendation of the registrar and by vote of the faculty, class honors are awarded to those members of the freshman and sophomore classes who have made an average of 3.00 or better during the preceding year. The names of these students are announced on Founder's Day and published in the university Register. Notice is also sent to the parent or guardian and to the principal of the high school or preparatory school of which the student is a graduate.

Special Honors

Special honors are awarded at the end of the senior year, on recommendation of the head of the department concerned and by vote of the faculty, to students who have done advanced work of unusual merit in some chosen field. Candidates for special honors must indicate during the junior year their intention to work for such honors. Awards are based on grades obtained in the subject chosen, the results in extra work assigned, and the general proficiency of the candidate as evidenced either by a final examination or a thesis, as the head of the department involved may direct. Special honors are announced at the graduation exercises.

ORGANIZATIONS

Honorary Scholarship Societies

PHI BETA KAPPA. Students in the College of Arts and Science and the College of Business Administration who up to the middle of the senior year maintain high scholarship may be elected to membership; also a limited number of engineering students whose work in philosophical, scientific, and language studies is of high grade.

TAU BETA PI. This national honorary society, which now has forty-one chapters, was founded at Lehigh University in 1885 by Professor E. H. Williams, Jr. Students in the College of Engineering who up to the end of the sophomore year maintain high scholarship may be elected to membership.

SIGMA XI. Election to membership is based upon the completion of original and noteworthy research in pure or applied science and the publication of the results thereof. Ordinarily undergraduates are eligible to associate membership only, their

election being based upon their promise of achievements in scientific research.

Other Honorary Scholarship Societies

ALPHA EPSILON DELTA (pre-medical)
ETA KAPPA NU (electrical engineering)
ETA SIGMA PHI (classics)
PHI ALPHA THETA (history)
PHI ETA SIGMA (freshman)
PI MU EPSILON (mathematics)
PI TAU SIGMA (mechanical engineering)
ROBERT W. BLAKE SOCIETY (philosophy)

Course Societies

Intellectual interest in various fields of study and professional spirit among pre-medical, business, and engineering students is promoted by a group of organizations commonly called course societies. The first of these organizations historically was the Chemical Society, established in 1871. The list now includes:

In Arts and Science

Delta Omicron Theta (public speaking)
Ernest W. Brown Astronomical Society
International Relations Club (history and government)
Newtonian Society (mathematics)
Robert W. Hall Pre-Medical Society

In Business Administration

Alpha Kappa Psi (professional fraternity in business administration)

In Engineering

Chemical Society
Student Chapter of the American Society of Civil Engineers
Electrical Engineering Society (student branch of the American Institute of Electrical Engineers)
Fritz Engineering Research Society
Industrial Engineering Society
Mechanical Engineering Society (student branch of the American Society of Mechanical Engineers)
Metallurgical Society
Mining and Geological Society (student branch of the American Institute of Mining and Metallurgical Engineers)
Physics Club
Radio Club

Other Organizations

Other student organizations include:

Aero Club
Alpha Phi Omega (national service scouting fraternity)
Alpha Town House (independent living group)
Arcadia (student self-government council)
Army Ordnance Association (Lehigh Post)
Brown Key Society (letter men)
Chess Club
Combined Musical Clubs
Cosmopolitan Club
Cut and Thrust Society (fencing)
Cyanide Club (junior honorary society)
Dance Orchestra
DeMolay Club
Glee Club
Golf Club
Ice Hockey Club
Interdormitory Council
Interfraternity Council
Lacrosse Club
Lehigh-Allentown Club
Lehigh Camera Club
Lehigh University Band
Lehigh University Life Saving Society
Mustard and Cheese (dramatic club)
Omicron Delta Kappa (senior honorary fraternity)
Pi Delta Epsilon (honorary journalistic fraternity)
Rifle Club
Scabbard and Blade (honorary military fraternity)
Shop Club (hobbies)
Spiked Shoe (honorary fraternity, track athletics)
Sportsmen's Club
Student Concerts-Lectures Committee
Symphony Orchestra
Tone (music)
Town Council (off-campus living groups)

The following Greek letter fraternities have chapters at Lehigh University: Alpha Chi Rho, Alpha Kappa Pi, Alpha Tau Omega, Beta Kappa, Beta Theta Pi, Chi Phi, Chi Psi, Delta Phi, Delta

Sigma Phi, Delta Tau Delta, Delta Upsilon, Kappa Alpha, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Gamma Delta, Phi Sigma Kappa, Pi Kappa Alpha, Pi Lambda Phi, Psi Upsilon, Sigma Alpha Nu, Sigma Chi, Sigma Nu, Sigma Phi, Sigma Phi Epsilon, Tau Delta Phi, Theta Delta Chi, Theta Kappa Phi, Theta Xi.

Student Publications

The students of Lehigh University publish a semi-weekly college newspaper, *The Lehigh Brown and White*; a monthly magazine, *The Lehigh Bachelor*; a year book, *The Epitome*; an annual *Freshman Handbook*; and an annual *Directory of The Interfraternity Council*.

ALUMNI ASSOCIATION

The Alumni Association, which has been in existence since 1876, was incorporated in 1917 under the name the Alumni Association of the Lehigh University, Inc. The offices of the association are in the Alumni Memorial Building. Along with the regular alumni activities, the association is largely concerned with raising money to meet the needs of the University.

The officers of the Alumni Association for 1940-41 are:

President, Alfred V. Bodine, '15, of Bridgeport, Conn.

Vice-President, George S. Baton, '94, of Pittsburgh, Pa.

Vice-President, Walter F. Perkins, '13, of Baltimore, Md.

Treasurer, Robert S. Taylor, '95, of Bethlehem, Pa.

Acting Secretary and Editor of *Lehigh Alumni Bulletin*, Robert F. Herrick, '34, of Bethlehem, Pa.

Archivist, Howard Eckfeldt, '95, of Bethlehem, Pa.

The following are the local alumni clubs: New York Lehigh Club, Philadelphia Lehigh Club, Pittsburgh, Lehigh Club, Chicago Lehigh Club, Washington, D. C. Lehigh Club, Detroit Lehigh Club, Cincinnati Lehigh Club, Northeastern Pennsylvania Lehigh Club (Scranton and Wilkes-Barre, Pa.), Maryland Lehigh Club (Baltimore, Md.), Youngstown (O.) Lehigh Club, Lehigh Club of Louisville (Ky.), Lehigh Club of New England (Boston, Mass.), Lehigh Club of Central Pennsylvania (Harrisburg, Pa.), Lehigh Club of Northern New York (Schenectady, N. Y.), Lehigh Club of Central New York (Rome, N. Y.), Lehigh Club of Northern Ohio (Cleveland, O.), Lehigh Club of Southern New

England (Hartford, Conn.), Lehigh Club of Western New York (Buffalo, N. Y.), Southern Anthracite Lehigh Club (Pottsville, Pa.), Lehigh Home Club (Bethlehem, Pa.), Lehigh Club of China (Shanghai, China), Lehigh Club of Southeastern Pennsylvania (Reading, Pa.), Lehigh Club of Central Jersey (Trenton, N. J.), Lehigh Club of York (Pa.), Lehigh Club of Northern New Jersey (Newark), Lehigh Club of Northern California (San Francisco), Lehigh Club of South Jersey (Atlantic City), Lehigh Club of Southern California (Los Angeles), Lehigh Club of Delaware (Wilmington), Lehigh Club of Monmouth County, N. J.

BUILDINGS AND GROUNDS

The University occupies twenty buildings and grounds covering one hundred eighty acres on the north side of South Mountain, overlooking the valley of the Lehigh River and the city of Bethlehem. In addition, the University has an athletic field of ten acres in area with field house, gymnasium, and covered grandstand, located about a mile from the university campus.

Packer Hall

Packer Hall is a four-story sandstone building, 215 feet long and 60 feet wide.

The department of civil engineering occupies the greater part of the first and second floors. The instrument rooms contain transits, levels, a large geodetic theodolite, plane tables, and other instruments for engineering field work. In the department headquarters is a collection of plans of engineering structures.

The departments of mathematics and astronomy, philosophy, education, and psychology are located in this building. The psychology laboratory has the standard equipment for the several courses in experimental psychology and for research.

The William H. Chandler Chemistry Laboratory

The Chemistry Laboratory is a three-story fire-proof sandstone building, 259 feet long and 44 feet wide, with a wing 62 feet long and 42 feet wide, and with a three-story extension 60 feet long and 37 feet wide. An additional three-story wing 116 feet long by 52 feet wide has been added to the east of the original building.

Laboratory space and equipment are provided for qualitative and quantitative analysis, inorganic chemistry, organic chemistry, sanitary chemistry, industrial biochemistry, colloid chemistry, X-ray analysis, gas analysis, the furnace assay of ores, industrial chemistry, chemical engineering, and research in chemistry and chemical engineering. A chemistry museum is located in this building.

The trustees of the University named this building, exclusive of the new east wing, the William H. Chandler Chemistry Laboratory in recognition of Dr. Chandler's thirty-five years' service as professor of chemistry, 1871-1906. The trustees have named the east wing the Harry M. Ullmann Chemistry Laboratory, in recognition of his service as head of the chemistry department.

The Physics Laboratory

The Physics Laboratory is a four-story sandstone building, 240 feet long and 44 to 56 feet wide. This building is devoted entirely to the department of physics. Apparatus and other facilities are provided for lecture and laboratory inspection and research. In addition to offices, recitation rooms, and lecture rooms there are several large laboratory rooms, a reading room, machine shop, wood working shop, glass-blowing room, constant-temperature rooms, storage battery room, sound-proof rooms, dark rooms, and several research laboratories. The building is equipped throughout with water, gas, compressed air, and electric power outlets.

The W. A. Wilbur Engineering Laboratory and Power House

The W. A. Wilbur Engineering Laboratory and Power House is a two-story sandstone building, 188 feet long and 44 feet wide.

The power plant contains four Babcock and Wilcox straight-tube cross-drum boilers, each rated at 300 boiler horse power; four Coxe chain grate stokers, two turbine driven Sturtevant blowers, and coal, water, and ash handling equipment of modern design. The plant is designed and equipped to provide steam at 250 lbs. pressure to the engineering laboratories, in addition to heating the university buildings. It is so arranged that any boiler can be isolated for laboratory tests for long periods if necessary. From this plant a six-inch line carries steam to the Packard Laboratory at the pressure desired for the laboratory work. Modern safety appliances and measuring equipment have been incorporated.

A coal-storage yard has room for four months supply of coal, and a system of belt conveyors and bucket-elevators is provided for receiving coal, dumping it on storage pile, and conveying it into the boiler room as needed.

Williams Hall

Williams Hall, the donation of Dr. Edward H. Williams, Jr., of the class of 1875, was so named by the trustees of the University in recognition not only of this gift but also of Dr. Williams' long continued and important service to the University as professor of mining and geology.

Williams Hall is a three-story brick building, 186 feet long and 70 feet wide. It contains the offices, class rooms, laboratories, departmental libraries, and museum collections of the departments of metallurgical engineering, geology, and biology.

The Fritz Engineering Laboratory

The late John Fritz, of Bethlehem, known as the father of the steel industry in the United States, a member of the original board of trustees of the University, gave to the University funds for the erection and thorough equipment of an engineering laboratory. The building was designed and erected under the personal supervision of Mr. Fritz. The building is equipped with a general testing section for testing iron and steel, a cement and concrete section, and a hydraulic section. The equipment is used by the civil engineering department in connection with its research projects and for instruction in mechanics of materials, hydraulics, and cement and concrete.

The Fritz Engineering Laboratory is of brick and steel frame construction, 115 feet long and 94 feet wide, with the main central section 65 feet in height, and two side sections of lesser height. An electrically-operated traveling crane, of 10-ton capacity, commands the entire central portion of the building in which the testing of large specimens is carried on.

The general testing section is equipped with an 800,000 pound Riehle vertical screw testing machine, capable of testing columns 25 feet long or less, tensile specimens 20 feet long or less, and transverse specimens up to lengths of 30 feet; an Olsen universal testing machine of 300,000 pounds capacity; smaller machines for ordinary tension, compression, transverse, and torsion tests; a cold-bend testing machine, impact and fatigue machines, and a

small machine shop. The hydraulics section is equipped with various tanks, weirs, pumps, and other apparatus for studying problems in hydraulics. The cement and concrete section has a large room for the making and testing of specimens and a room for the storage of materials.

The Eckley B. Coxe Mining Laboratory

The Eckley B. Coxe Mining Laboratory is a two-story sandstone building, 100 feet long and 75 feet wide. It is occupied exclusively by the department of mining engineering.

The building contains the office of the professor of mining engineering, the main lecture room, a locker and wash room, the office of the professor of ore dressing and fuel technology, a laboratory equipped for fuel research, a balance room, a sampling laboratory, and shop.

On the lower main floor are two air compressors, rock drills, a large concentrating table, a Chance coal cleaner, and a motor-generator set. The upper main floor contains a gyratory crusher, rolls, stamp mill, jigs for coal and ore, concentrating table, vaner, and centrifugal roller-mill.

The lower second floor is equipped as a fuel technology laboratory, with chemical work tables and apparatus for coal, gas, and oil analysis, combustion, calorimetry, pyrometry, coal and oil distillation. The upper second floor is arranged for laboratory work in ore dressing and coal preparation. The equipment comprises two magnetic separators, a rod mill, a jig, three types of flotation machines, a small laboratory concentrating table, a small bowl classifier, and a suction filter. A small mine-trap ventilating fan with ducts permits air current measurements. A portion of this floor is also used for mine surveying map work.

The laboratory was named by the trustees of the University in memory of Eckley B. Coxe, who was a pioneer and a leader in the profession of mining engineering in this country, and an active friend and valued trustee of the University from its early days until his death.

Christmas-Saucon Hall

Christmas-Saucon Hall is a three-story stucco building. It contains the office of the College of Business Administration, the offices, lecture rooms, and recitation rooms of the departments of English, accounting, economics and sociology, and finance, the

offices and dispensary of the students' health service, and the editorial and business office of the *Brown and White*, student semi-weekly newspaper. Christmas Hall has historic interest as the first building of Lehigh University.

Coppée Hall

Coppée Hall is the headquarters of the College of Arts and Science. It contains the offices of the College of Arts and Science, a lecture room, and the offices and recitation rooms of the departments of German, Latin, Greek, romance languages, history and government, and fine arts.

Sayre Observatory

The Sayre Observatory was the gift of the late Robert H. Sayre, one of the original trustees of the University.

The observatory contains an equatorial telescope of six inches clear aperture and of eight feet focus, by Elvin Clark; a zenith telescope of four and one half inches clear aperture; an astronomical clock, by William Bond & Son; a meridian circle; a prismatic sextant, by Pistor and Martins; an engineer's transit and a sextant, by Buff and Buff. Students in practical astronomy receive instruction in the use of the instruments and in observation.

The land upon which the observatory stands, consisting of seven acres adjoining the original grant, was presented to the University by the late Charles Brodhead, of Bethlehem.

The Packer Memorial Church

The Packer Memorial Church, in which chapel services are held, was the gift of the late Mrs. Mary Packer Cummings, daughter of the founder of the University. It was built in 1887. Occasionally musical recitals and the annual Bach Festival are held in this building and it houses the scores, records, and phonograph of the College Music Set, the gift of the Carnegie Foundation.

The University Library

The original library building was erected by the founder of the University in 1877 as a memorial to his daughter, Mrs. Lucy Packer Linderman. The present library, constructed on three sides of the original building, is in the collegiate Gothic style of architecture. It contains five times the floor space of the old structure and affords shelving capacity for approximately 500,000 volumes. Space in the reading room and seminars and other

special rooms is sufficient for about 500 readers. Adequate space for the cataloguing departments and other purely administrative functions of the library is provided, together with special rooms for the treasure collection and the Lehigh collection. There are eleven seminar rooms for advanced study. The building contains a browsing room and an art gallery. Individual cubicles are available in the stacks for advanced students and research workers.

244,000 volumes are now upon the shelves. The list of current periodicals numbers about nine hundred and eighty. The library is especially rich, for one of its size, in materials for research in history, American newspapers, and the history of early science, and in the files of technical journals. The library is a depository for government documents.

Small working reference collections for laboratory use are maintained by the departments of biology, geology, chemical, civil, mechanical, and mining engineering.

The library is open, except on holidays, from 8 a.m. to 10 p.m.; from 8 a.m. to 5 p.m. on Saturdays; and on Sundays from 2 p.m. to 10 p.m.

The use of the library, with privilege of borrowing books, is offered to all members of the University: faculty, students, and alumni. Students are allowed free access to the books and are encouraged to become familiar with methods of using a library for literary and scientific work. The privileges of the library are also extended to all qualified residents of the city. The library offers its service to the industries located in the community.

The Eckley B. Coxe Memorial Collection

In memory of Eckley B. Coxe, for many years a trustee of the University, Mrs. Coxe presented to the University his technical library consisting of 7,727 volumes and 3,429 pamphlets. As the working library of a man who was remarkable for the extent and thoroughness of his acquaintance with the whole field of applied science, this collection possesses great value for students of science and engineering.

The Joseph W. Richards Collection

The Joseph W. Richards Library of Metallurgy and Chemistry, consisting of about 3,000 volumes, is located on the second floor of Williams Hall, and is open for use under the supervision of the department of metallurgy.

The Lehigh Art Gallery

Frequent exhibitions are held in the art gallery of paintings, watercolors, drawings, sculpture, photographs, or prints—chiefly by contemporary American and foreign artists. The University owns a small collection of prints and a few paintings, largely gifts of alumni and friends of the University; these are also exhibited from time to time. The Lehigh Art Gallery is a definite part of the university's educational and cultural program. While intended primarily for the interest of students, the exhibitions are open freely to the public.

Charles Russ Richards House

The Charles Russ Richards House is a new four-story fireproof dormitory which was completed September, 1938. It has accommodations for 144 students. It contains an adequate recreation room, a capacious lounge, two reception rooms for visiting friends, attractive single rooms, and a limited number of suites. The rates for the suites are \$200 a year for each occupant, for single rooms \$180 and \$190 a year, and for double rooms \$140 and \$150 a year for each occupant.

Henry Sturgis Drinker House

The Henry Sturgis Drinker House, a new four-story fire-proof dormitory, completed in September, 1940, has accommodations for 126 students. It is equipped with a recreation room, a spacious lounge, a reception room for visitors, very attractive single rooms, and a limited number of double rooms. The rates for the single rooms are \$180, \$190, and \$200 a year, and for the double rooms, \$140, \$150, and \$180 a year for each occupant.

Eugene Gifford Grace Hall

Eugene Gifford Grace Hall, named for the donor and devoted to sports and recreation, is a stone building, approximately 120 feet wide and 180 feet long. It provides a sports theater which also serves as an assembly room for the University with a seating capacity of about 3000. The upper floor consists of an armory drill floor, which is also available for the larger university dances and receptions. The building contains rooms for the band and orchestra, offices, athletic teams, and classrooms for the Reserve Officers' Training Corps. Promenade terraces at the level of the dance floor on three sides of the building afford views over the Lehigh Valley and of South Mountain.

Charles Lewis Taylor House

The Charles Lewis Taylor House, the gift of Mr. Andrew Carnegie, is a three-story concrete dormitory with accommodations for 145 students. There are suites of three rooms (a study and two adjacent bedrooms) for two occupants, and a few single rooms. The building was named Taylor Hall by Mr. Carnegie in honor of Charles L. Taylor, his former partner in business, a graduate of the University of the class of 1876, and a trustee of the University. The rates for the suites of rooms are \$140 and \$115 a year for each occupant. The single rooms are \$50, \$75, \$92, \$104, and \$115 a year.

Henry Reese Price House

The Henry Reese Price House furnishes dormitory accommodations for thirty-eight students. It was named in honor of Dr. Henry R. Price, an alumnus of the University of the class of 1870, late president of the board of trustees. The rates vary from \$50 to \$135 a year for each occupant.

Drown Memorial Hall

Drown Memorial Hall was erected by friends and alumni as a memorial to the late Thomas Messenger Drown, LL.D., president of the University from 1895 to 1904. The building is devoted to the social interests of the university students. It contains study, reading, and lounging rooms, an assembly hall, the offices of Arcadia (student governing body), the college publications, and the dramatic and musical organizations, and faculty club rooms. A cafeteria is located in the basement.

Alumni Memorial Building

The Alumni Memorial Building, which is used as the administration building of the University, was erected as a memorial to 1,921 Lehigh men who served in the World War, and especially to the forty-six who gave their lives. The cost of erection was raised by subscription from about 1700 alumni. The Memorial Hall contains the records of the Lehigh men who served and those who died, together with mementos of the war.

In the south wing of the building are the offices of the president, the dean of undergraduates, the registrar, the director of admissions, the superintendent of buildings and grounds, and the director of placement. The north wing contains the offices of the treasurer, the bursar, the auditor, and the alumni association, the university supply bureau, and a large room used for faculty meet-

ings and the meetings of the alumni association and of the alumni council.

Taylor Gymnasium and Field House

In 1913 Charles L. Taylor, E.M., '76, donated to the University the funds required for the erection of a gymnasium and field house.

Taylor Gymnasium adjoins the athletic field. The building is 222 feet long and 73 feet wide. On the ground floor is located the game room, 93 by 70 feet, used for basketball and wrestling. The game room is surrounded by a gallery for spectators. The main gymnasium floor measures 90 by 70 feet. Other rooms in Taylor Gymnasium are the offices of the director of athletics and physical education, staff offices and measuring room of the department of physical education, basketball and handball courts, fencing, boxing, and wrestling rooms, and locker rooms with accommodations for the entire student body.

The gymnasium is equipped with modern appliances for individual and class work in recreative and corrective exercises, calisthenics, and other gymnastics. Adjoining the locker rooms is a swimming pool, 75 by 25 feet, with a depth from $4\frac{1}{2}$ to $9\frac{1}{2}$ feet, and with a capacity of 95,000 gallons.

Adjoining the gymnasium and the stadium is the Taylor Field House. It is two stories in height, and has dressing rooms, lockers, and shower baths for visiting and Lehigh teams.

Taylor Field

An athletic field of more than nine acres in area is provided for the accommodation of students who participate in the various outdoor sports. The stadium, located on the lower level, provides football and baseball fields, surrounded by concrete stands having a seating capacity of 12,000. On the upper level there is a practice field for football, baseball, lacrosse, and soccer; also a quarter mile track and a 220-yard straight-away. During the winter months a wooden outdoor running track, twelve laps to the mile, is provided.

Lehigh Field and Field House

An additional athletic field of ten acres in area, with field house, gymnasium, and covered grandstand, is located about a mile from the university campus. The field house has dressing rooms, lockers, and shower baths; the gymnasium is equipped

with basketball and volley ball courts. Here are eleven tennis courts for intercollegiate and intramural tennis. This field includes a playing ground for intercollegiate soccer and a field for intramural baseball and other intramural activities.

Armory

The armory contains the offices, class rooms, storage rooms, and two indoor rifle and pistol ranges of the department of military science and tactics.

The James Ward Packard Laboratory of Electrical and Mechanical Engineering

The late James Ward Packard, who was graduated from Lehigh University in 1884 with the degree of mechanical engineer, the designer of the first Packard motor car, the founder of the Packard Motor Car Company of Detroit, Michigan, and of the Packard Electric Company of Warren, Ohio, donated \$1,200,000.00 for the erection and equipment of an electrical and mechanical engineering laboratory.

The Packard Laboratory is a five-story steel-framed sandstone building 225 feet long and 180 feet wide. The lobby is finished in Italian travertine. The halls throughout the building are wainscoted with Tennessee marble. An auditorium on the first floor with a seating capacity of 622 is equipped with still- and talking-motion-picture apparatus.

The western half of the building is devoted to the work of the department of electrical engineering and contains the offices, class rooms, research rooms, and laboratories of the department. The main dynamo laboratory contains over a hundred generators and motors of various types. The high-tension laboratory is equipped with a 150 kv. and a 60 kv. testing transformer, a 700 kv. oscillation transformer, and sources of high d.c. voltage up to 100 kv. The transients laboratory is provided with six magnetic oscillographs, two cathode-ray oscillographs, two artificial transmission lines, a surge generator, and a photographic dark room. A five-unit harmonic phase-shifting motor generator set supplies voltages of various frequencies and wave forms for special tests. The communications laboratory has an extensive equipment of high-frequency measuring apparatus, vacuum-tube circuits, speech amplifiers, and a 40/80 meter transmitter (C.W. or phone) used by the radio club. The wiring system provides for quick communication and inter-connection between any two parts of the

building. A portion of the basement is given to the installation of transforming machinery and switchboard for the laboratory power supply.

The eastern half of the building houses the department of mechanical engineering with offices, drawing rooms, class rooms, research rooms, reading and study room, photographic dark room, shop, instrument rooms, and laboratories. The general laboratory comprises a series of air compressors, steam engines, turbines, and pumps ranging from the simplest types to the ultra modern turbo-generator. Each unit is provided with the necessary auxiliaries for testing. The internal combustion laboratory contains a range of modern internal combustion engines: the simple gasoline engine, the semi-Diesel, ten automobile engines, an aeroplane engine, and two Diesel engines. All of these engines are arranged for connection to dynamometers, water brake, or prony brake such that determinations of efficiency and economy may be readily made. For the laboratory study of the principles of heating, ventilation, air conditioning, and refrigeration, there are available a fully equipped house heating unit and a refrigeration laboratory. The latter contains both an ammonia compressor and a CO₂ compressor which operated in series make possible a cold room temperature of fifty degrees below zero.

Sayre Park

A development of the mountain side of the university grounds was effected through the donation to the University in 1909 of the sum of \$100,000.00 by the children of the late Robert H. Sayre, to be used in the development of Sayre Park as a memorial to their father, who was a trustee of the University from its foundation in 1866 to his death in 1907.

The Arboretum

The Arboretum is a tract of about eleven acres adjoining Sayre Park. It was established by a friend of the University as a tree nursery for the purpose of furnishing illustrative specimens of American trees, and of cultivating trees and shrubs for the beautifying of the park. All of the more important species of North American trees are to be found in the university park and the arboretum. Adjoining the arboretum a tract of seven acres has been planted with a variety of indigenous trees as an exhibition growth of tree culture.

GENERAL REGULATIONS CONCERNING GRADUATION

Eligibility for Degree

To be eligible for a degree from Lehigh University, a student must not only have completed all of the scholastic requirements for the degree, but he must have paid all university fees, and in addition all bills for the rental of rooms in the dormitories, or for damage to university property or equipment, or for any other indebtedness to the University; it being understood, however, that this regulation does not apply to any indebtedness for scholarship loans or for loans from trust funds administered by the University which are protected by properly executed notes approved by the treasurer.

Final Date for Completion of Requirements

For graduation on University Day all requirements, scholastic and financial, must have been met by 12 o'clock noon on the Friday preceding the graduation exercises; and for graduation on Founder's Day these requirements must have been met by 12 o'clock noon on the Saturday preceding Founder's Day.

Notice of Candidacy for Degree

Candidates for graduation on University Day file with the registrar on or before May 15 a written notice of candidacy for the degree, which notice shall bear the bursar's receipt for the required graduation fee of \$10.00; candidates for graduation on Founder's Day file a similar notice of candidacy on or before September 25. Failure to file such notice by the dates mentioned debars the candidate from receiving the degree at the ensuing graduation exercises. A candidate who pays his graduation fee and then fails to qualify for graduation will, on application, receive a refund of the fee.

MISCELLANEOUS

Graduating Theses

Undergraduate theses, when required, are accompanied by drawings and diagrams, whenever the subjects need such illustration. The originals are kept by the University, as a part of the student's record, for future reference, but copies may be retained by students, and may be published, permission having first been obtained from the faculty.

University Sunday

The Sunday preceding University Day is known as University Sunday, and is devoted to the baccalaureate service. The baccalaureate sermon on June 9, 1940 was preached by the Right Reverend Wallace J. Gardener, D.D., Bishop of the Diocese of Trenton, New Jersey.

University Day

University Day marks the close of the academic year. On this day the graduation exercises are held, an address is given, senior honors and prizes are announced, and degrees are conferred. The address at the exercises on June 10, 1940 was given by Henry Woodburn Chase, Ph.D., LL.D., Chancellor of New York University. Commissions in the Officers' Reserve Corps were awarded by Colonel Joseph S. Leonard, professor of military science and tactics.

Founder's Day

The first Wednesday in October each year is celebrated as Founder's Day in honor of the founder of the University, Asa Packer. Degrees are conferred and freshman and sophomore honors and prizes are announced.

At the exercises on October 2, 1940, the sixty-first Founder's Day, an address entitled "The Stamina of American Youth" was delivered by Clement Clarence Williams, C.E., Sc.D., Eng.D., LL.D., President of Lehigh University.

LEHIGH INSTITUTE OF RESEARCH

The Lehigh Institute of Research was organized in 1924 to encourage and promote scientific research and scholarly achievement in every division of learning represented in the organization of the University, and in recognition of the need for further and more exact knowledge in science and in the applications of science to the affairs of modern life.

The purposes of the Institute of Research include (1) the training of men for research work, (2) the publication of the results of investigations, (3) the conduct of general research, (4) the conduct of cooperative research, (5) the conduct of commercial tests and advisory service.

Detailed information concerning the organization and regulations of the Institute of Research are given in a pamphlet which will be furnished on request.

RESEARCH FELLOWSHIPS

Graduates in appropriate curricula of colleges, universities, and technical schools whose requirements for graduation are substantially the same as those at Lehigh University are eligible for appointment to the research fellowships listed below. Candidates for fellowships must make application on blanks which will be provided by the University on request. Requests for the blanks should be addressed to the dean of the Graduate School, Lehigh University, Bethlehem, Pa. Applications must be filed on or before March 1. Each application must be accompanied by a certificate of the candidate's college work, a statement concerning his practical experience, and any other evidence of his qualifications which he may choose to submit. An applicant must indicate the line of graduate study he desires to undertake and his special qualifications for such work.

A holder of a fellowship may not accept any employment for pay without the written permission of the dean of the Graduate School.

Holders of fellowships, who also pursue graduate work at the University, are exempt from the payment of the university tuition fee.

New Jersey Zinc Company Research Fellowship

The New Jersey Zinc Company provided funds in 1924 for a research fellowship to be known as the New Jersey Zinc Company Research Fellowship.

Appointment to this fellowship is for the period of two academic years, beginning September 1 and ending June 30, with an annual stipend of \$600.00 payable in ten instalments. Half of the time of the holder of this fellowship must be devoted to research work in the department to which he is assigned; the other half to graduate study leading to a master's degree at the end of the two-year appointment, provided all university requirements for this degree have been satisfied. The holder of this fellowship is required to devote approximately ninety hours a month, exclusive of university holidays, to research work assigned to him in the department to which he is attached.

The Henry Marison Byllesby Memorial Research Fellowships

In 1926 Mrs. H. M. Byllesby, widow of Col. H. M. Byllesby, M.E., '78, President of the Byllesby Engineering and Management Corporation, provided an endowment fund for the establishment of the Henry Marison Byllesby Memorial Research Fellowships in Engineering.

Appointments to these fellowships are for two academic years with an annual stipend of \$750.00 payable in ten instalments. Half of the time of the holders of these fellowships must be devoted to research work on some problem in electrical, mechanical, or hydraulic engineering, proposed by the President of the Byllesby Engineering and Management Corporation and approved by the Lehigh Institute of Research; the other half to graduate study leading to the degree of Master of Science at the end of the two-year appointment, provided all university requirements for this degree have been satisfied.

The James Ward Packard Research Fellowship in Electrical or Mechanical Engineering

The income from a bequest from James Ward Packard, M.E., '84, provides for a research fellowship in either electrical or mechanical engineering. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$600.00.

The C. Kemble Baldwin Research Fellowship in Aeronautics

A fund provided by Mrs. C. Kemble Baldwin as a memorial to her husband, C. Kemble Baldwin, M.E., '95, provides for the occasional appointment of a research fellow in any branch of science having a bearing on the field of aeronautics. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$750.00.

**The Lawrence Calvin Brink Research Fellowship
in Civil Engineering**

A fund provided by the late Mrs. L. C. Brink as a memorial to her husband, Lawrence Calvin Brink, C.E., '94, provides for the occasional appointment of a research fellow in civil engineering. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$600.00.

The Student Chemistry Foundation Fellowships

In the spring of 1927, members of the class of 1930 established the Student Chemistry Foundation in honor of Harry M. Ullmann, then head of the department of chemistry. Subsequent classes have contributed to the fund. This fund provides two research fellowships, for which Lehigh University graduates only are eligible. Appointments to these fellowships are for a period of two academic years, with an annual stipend of \$600.00.

**The Garrett Linderman Hoppes Research Fellowship
in Civil Engineering**

A research fellowship in civil engineering was established by the late Mrs. Maria B. Hoppes in memory of her son, the late Garrett Linderman Hoppes, C.E., '83. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$600.00.

The William L. Heim Research Fellowship in Chemistry

A research fellowship in chemistry was established by William L. Heim, B.S. in Chem., '02. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$600. The research at present is in the field of X-ray analysis.

**The Roy R. Horner Research Fellowship in Metallurgy
and Inorganic Chemistry**

The income from a bequest by Roy R. Horner, B.S., '99, provides for a research fellowship in either metallurgy or inorganic chemistry. The appointment is for two years with an annual stipend of \$600.00. The holder of this fellowship will devote half-time to research under the direction of the faculty, and half-time to graduate study. While the appointment will generally be made alternately between the metallurgy department and the chemistry department, it may be determined by the qualifications of available candidates.

The Katharine Comstock Thorne Fellowship in Biology

The late Gordon Comstock Thorne of the class of 1916 endowed the Katharine Comstock Thorne Fellowship in Biology in memory of his mother. The appointment is for two years at a stipend of \$500.00 annually and free tuition. The appointee will devote half his time to research in the department and half his time to graduate study.

A research fellowship in metallurgy was established by John H. Frye, Sr. Appointment to this fellowship is for a period of two academic years, with an annual stipend of \$600. The research at present is in the field of physical metallurgy.

Industrial Research Fellowships

Lehigh University cooperates with industrial concerns in offering fellowships for the study of research problems along specialized lines. The following industrial research fellowships have been established.

THE R. K. LAROS SILK COMPANY RESEARCH FELLOWSHIP for research in the technology of silk. One fellowship with an annual stipend of \$720.00.

THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION RESEARCH FELLOWSHIPS for research in steel construction. Two fellowships with an annual stipend of \$600.00.

THE AMERICAN BUREAU OF WELDING RESEARCH FELLOWSHIP for research in electric welding. One fellowship with an annual stipend of \$600.00.

SETON LEATHER COMPANY FELLOWSHIP for research in leather technology. One fellowship with an annual stipend of \$720.00.

RAYBESTOS-MANHATTAN COMPANY FELLOWSHIPS for research in asbestos products and brake linings. Two fellowships with an annual stipend of \$720.00.

THE DEVOE AND RAYNOLDS COMPANY RESEARCH FELLOWSHIP for research in the field of colloid chemistry. One fellowship with an annual stipend of \$600.00.

NATIONAL OIL PRODUCTS COMPANY FELLOWSHIPS for research in textile oils. Two fellowships with an annual stipend of \$600.00.

MUTUAL CHEMICAL COMPANY OF AMERICA FELLOWSHIP for research in chromium compounds. One fellowship with an annual stipend of \$600.00.

SILVER RESEARCH COMMITTEE FELLOWSHIP for research in uses of silver salts. One fellowship with an annual stipend of \$600.00.

CORN PRODUCTS REFINING COMPANY RESEARCH FELLOWSHIP IN LEATHER TECHNOLOGY. One fellowship with an annual stipend of \$600.00.

THE HEAT EXCHANGE INSTITUTE FELLOWSHIP for research in the transfer of heat. One fellowship with an annual stipend of \$600.00.

ENDOWMENT OF FELLOWSHIPS

Research fellowships named in honor of an individual or a corporation offering opportunities for graduate work and training in research in any designated field of study may be established in perpetuity through the payment to the board of trustees of \$20,000.00. The income from this fund will be paid to the holder of the fellowship after the deduction of his tuition and laboratory fees. If a bequest for the establishment of a fellowship provides for half-time service as a research assistant in the Institute of Research, the remaining time to be devoted to graduate study, the University will remit the tuition fee and make only such charges against the fund as are necessary to cover the cost of materials, supplies, and apparatus that need to be provided for the work of the fellow.

DEGREES

DEGREES CONFERRED ON UNIVERSITY DAY,
JUNE 10, 1940

Honorary Degrees

DOCTOR OF ENGINEERING

Alexander Graham Christie
Professor of Mechanical Engineering, Johns-Hopkins University

Degrees in Course

DOCTOR OF PHILOSOPHY

Major in Mathematics

Henry Louis Langhaar, B.S. in M.E., M.S. (*Lehigh University*)

MASTER OF ARTS

Major in Education

William Edward Kuebler, B.S. (*East Stroudsburg State Teachers College*)

Major in English

James Henry Croushore, B.A. (*Lehigh University*)
Mary Elizabeth Herbert, Ph.B. (*Muhlenberg College*)
Kenneth Baker Horning, B.S. (*University of Illinois*)

Major in Mathematics

Edward Blum, B.S. (*Muhlenberg College*)
Howard Trythall Hemmerly, B.S. (*Moravian College*)
William Henry Innes, B.S. (*University of Akron*)
Marlyn Asher Rader, B.S. (*Moravian College*)
Nelson Paul Yeardley, A.B., M.S. (*Louisiana State University*)

MASTER OF SCIENCE

Major in Bacteriology

Bernard LeFort Wilker, B.S. (*Muhlenberg College*)

Major in Biology

Daniel Swartwood Grosch, B.S. (*Moravian College*)

Major in Chemical Engineering

William Fagan Gross, B.S. in Ch.E. (*University of Colorado*)
Ralph William Helwig, B.S. in Ch.E. (*Lehigh University*)

DEGREES

Major in Chemistry

Amos Raymond Esterly, B.S. in Chem. (*Pennsylvania State College*)
Jerome Ganz, B.S. in Chem. (*Lehigh University*)
Charles Frey Glick, B.S. in Ch.E. (*Lehigh University*)
Arthur Albert Green, B.S. (*Muhlenberg College*)
Thomas Franklin Jacoby, B.S. in Ch.E. (*Lehigh University*)
Edwin Francis Ottens, B.S. in Ch.E. (*Lehigh University*)
Richard Noble Rhoda, B.S. in Chem. (*University of Pittsburgh*)
William Heller Schnabel, B.S. in Ch.E. (*Lehigh University*)
Charles Frederick Smullin, B.S. in Ch.E. (*Lehigh University*)

Major in Civil Engineering

Lloyd Theodore Cheney, B.C.E. (*Syracuse University*)
Charles Allen Lee, B.S. in C.E. (*University of Wyoming*)
Otakar Ondra, B.A., Dipl. Ing. in C.E. (*Collège Français de Prague, Technical University of Prague*)

Major in Electrical Engineering

Charles William Harrison, B.S. in E.E. (*Purdue University*)
George William Klingaman, B.S. in E.E. (*Lehigh University*)
Robert Elton Stephan, B.S. in E.E. (*Purdue University*)
Charles Hoff Titus, B.S. in E.E. (*Lehigh University*)
Eric Weiss, B.S. in E.E. (*Lehigh University*)

Major in Geology

Wayne Frazier O'Neill, B.A. (*Lehigh University*)
John Hills Weitz, B.A. (*Wesleyan University*)

Major in Industrial Engineering

Edward Otis Dean, B.S. in M.E. (*Tufts College*)
George Francis Derr, B.S. in I.E. (*Lehigh University*)
Allen Richard Deschere, B.S. in M.E. (*Worcester Polytechnic Institute*)
Thomas Timings Holme, B.S. in M.E. (*Lehigh University*)

Major in Mechanical Engineering

Theodore Scott DuBose, B.S. in M.E. (*Clemson College*)
Wilson Vandervoort Pinky, M.E. (*Stevens Institute of Technology*)
Alexander Hinds Raye, B.S. (*University of Maine*)
Robert Lewis Scott, B.S. in M.E. (*Purdue University*)

Major in Metallurgical Engineering

Roy Edward Lorentz, Jr., B.S. (*University of Illinois*)
George Louis Schiel, B.S. in Met.E. (*Lehigh University*)
Winston Hugo Sharp, B.S. in Chem. (*University of Vermont*)

Major in Physics

Robert August Buerschaper, B.S. in Eng. Phys. (*Lehigh University*)
Allyn Collins Vine, B.A. (*Hiram College*)

BACHELOR OF ARTS

William Hewitt Baker	Anthony Nello Manone
Sylvester Demarest Beers	Victor William Marton
Bernard Berkowitz	Edwin Haviland Miller
Elmer Edmund Biro	Robert Howard Miller
Ralph T. Buchsbaum	Jules Laurence Moreau
Edward Norman Comando	Frank Graham Ort
Howard Michael Conner	Robert Bauer Palmer
James Constantine, Jr.	James Rutherford Park
Carlton Elmer Creitz	Charles Frederick Rehman
Albert James Cross	Robert Joseph Reid
Maynard Lake Diamond	George Henry Reussner, Jr.
LaRue G. Diehl	Carl Hazard Richardson
Alfred Lindon Everett	Clayton Lyman Roloson
Charles William Finady II	Clifford Donral Root
John Jacob Fischel	Terry Schiff
Edwin Arthur Fisher	Elmer Gould Smith
Carl Richard Fittkau	Robert Bruce Spilman
William Irvin Freeman	George Arthur Heckrotte Tice
Fred Eatley Galbraith, Jr.	William Burton Todd
David Richards Ginder	Randall Benton Tucker
Norman Hammer	Emery James Varga, Jr.
Roy Jules Hertz	John Carlisle Walker
Paul Karlik, Jr.	William Wescott West, Jr.
Quentin R. Gangewere Keith	Raymond Robert White
Russell Kowalyshyn	Donald Stevens Wilkinson
Howard John Lewis	

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Oscar Carl Ashman	Bertram VanWie Fletcher
Richard Charlesworth Baggot	Richard Charles Fries
Reginald Marsh Banks, Jr.	Stanley Ellis Gilinsky
John Chester Barr	Norman David Glickman
Charles Frederick Barton, Jr.	Elliott Kleiner Goodman
Frank Lee Benedict, Jr.	James Francis Goodwin
Edward Billstein, Jr.	Richard Spencer Gowdy
John Ralston Bingaman, Jr.	Charles Rupert Griffiths
Arnold Mandigo Bloss	Robert Stewart Grubmeyer,
Robert Steven Bothé	B.S. in E.E. (<i>Lehigh University</i>)
Gordon Lewis Brandt	Charles Franklin Guilford
Nathaniel Jules Brisker	Jack Gutttag
Charles Harris Brotherton	Walter Grady Guy, Jr.
Charles Duncan Brown, Jr.	Adolf Frederick Haffenreffer, Jr.
John Laidlaw Burgher	Thomas Bonney Hand
Ernest Reginald Buss	Jacob Shafter Hartzell
Robert Fulton Coleman	Charles Hookway Hearsey
Albert James Collins	William Webster Heimbach
Edward Francis Dannemiller	Clifford Budd Heisler
Olin Merrill David	Charles Reed Honce, Jr.
Paul Royal Duyckinck	John Glenn Hughes
William Herman Ellers	Joseph Boyd Kelley
Cary Grayson Evans	Thomson King, Jr.
Herbert Frederick Feucht	William Henry Kohring
Richard Fred Fincke	Rudolf Kremer

DEGREES

Robert Benton Kurtz	Lester Roland Rosenfeld
Loring Lane	John Bradley Rush
Harry Andrew Leidich, Jr.	Isaiah Scheeline, Jr.
Harry Wolfe Lynch, Jr.	Charles Taylor Schrader
George Pershing Maginnes	Alfred McLaughlin Schuyler
Leslie Perkins Mahony, Jr.	Paul Waldo Seiler, Jr.
Richard Dale Matheny	Robert Brooks Siegel
Joseph Leonard Matteson	Alfred Louis Simon
Arthur Alexander McCambridge	Samuel Robert Simon
J. Joseph McCluskey	Gardner Sletten
John Joseph McFadden	Robert Christie Slingerland
Robert Russell Merwin	Bernard Alois Smith
William Alexander Miller, Jr.	Raymond Miller Smith
Thomas William Millet III	James Richard Steeg
George Brinton Motheral II	Robert Stanley Taylor
Anders Finch Myhr	Willard Johnson Thomas
Robert Andrew Nordt	Otis Clark Thompson
John Robert O'Meara	Arthur George Ueberroth, Jr.
Douglas Campbell Paul	William Valentine, Jr.
Richard Frederic Pearce	Wallace Pattee Watkins
Frederick David Pierce	Elwood Webster
Albert Edward Ponter, Jr.	Harold Weiner
Stewart Broadus Powers	Harry Joseph Wenck
Harry Mathew Randel	Walter Joseph Wetherell
James Gilbert Richardson	Eudore Joseph Wilhelmy
Robert Harlan Robinson	Frank Chester Woodside, Jr.
D'Arcy Wentworth Roper II	Karl H. Zornig

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

William Adrian Blum, Jr.	John William Kreidler
John Branch	Theodore Leinbach Leininger
William Walter Brown	Royal Vincent Mackey, Jr.
William Franklin Carson, Jr.	Lewis Thornton Marks, Jr.
Robert Prentiss Carter	Ralph Edward Martin
John Cochran	George Jester Merritt
William Robert Csellak	Andrew Stanley Morrow, Jr.
Clarence Reynolds DeBow, Jr.	Norman Lester Morse
John Erich Decher	Herbert Emil Rasmussen
John Henry Duffin	Robert Whipple Richards
Frank Bower Elliott	James Francis Ryan, Jr.
Lester Charles Erich	George Frederick Salathe
Aaron Finger	Warren Everett Sawyer III
William Sherman Fiske	Wilbur Francis Schaffer, Jr.
Richard Charles Gangwer	Eugene Dwight Seiter
John Giacobbe	William Osborne Seltzer
Paul Radcliffe Gregory	Norman Abraham Shane
James Rogers Harris, Jr.	Edward Miles Sharp
Edward Albert Herre, Jr.	Elliott Small
Richard Paul Homiller	Daniel Endy Smith
Harry Branham Horne, Jr.	Russell Edward Stevens, Jr.
Arthur Henry Joecks	Georges Elias Tabet, B.A.
Ernest Frederic Johnson, Jr.	(<i>American University,</i>
Roger Frederic Kleinschmidt	<i>Cairo, Egypt</i>)
Fred Kornet, Jr.	Charles Arthur Trageser

Harold Francis Truchess
Francis Bernhardt Weiskopf
Edgar Francis Whitmore, Jr.
Harold Paul Wilson

Peter Zouck Wilson
Charles Albert Wolbach, Jr.
Donald Clinton Young

BACHELOR OF SCIENCE IN CHEMISTRY

John Philip Brandt
James Adrian Erdle
George Holmes, Jr.
Richard Carlyle Kelley, Jr.
Christian Robert Emil Merkle, Jr.

Thomas Emory Ricketts
Charles Joseph Schaefer
George Sidney Sprague
Ralph Gustave Steinhardt, Jr.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Andrew Breese Baker
Walter Randall Catching, Jr.
William Rowe Clark
Alfred Thomas Cox
Ambrose Graham Delany
John Clark Gregg
George Vinton Griffith
Frank Edwin Harper, Jr.

Paul Artman Hunter
Ralph Grant Johnson, Jr.
John Orth Liebig, Jr.
Robert Cornelius Lynch, B.S.
(*St. John's University*)
Vivian Gaines Paul, Jr.
Lester Landis Spengler, B.S.
(*Moravian College*)

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Gilbert Paine Cardwell
Louis Heinrich Alois Feher
Robert Ray Godard
William Delaplaine Green
Edward Leith Hess
Harold Clifford Hixson
Edward Cecil James
Robert Benton Kurtz, B.S. in Bus.
Adm. (*Lehigh University*)
John Vincent McGuire

Arthur Samuel Mickley
Harold Emil Moosmann
Leonard Bower Rahn
Harold Harvey Luther Rinker
Walter Morrison Schweder
Robert John Seugling
Willard Miller Shelly
Josef Sofsky
Hulme Willard Thomas

BACHELOR OF SCIENCE IN ENGINEERING PHYSICS

Bernard Altshuler
Herbert Frederick Engelmann
Robert Charles Good, Jr.
Robert Dearborn Marsden
William Francis Morgan

William Bernard Pohlman
William Dickinson Shields, Jr.
Edward George Uhl
John Lamar Worzel
William Byron Wrigley

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

Robert Albert Ackerman II
Chester Case Baldwin
Lester Robert Bittel
Alfred VanSant Bodine, Jr.
Aaron House Brennessholtz
Louis John Gottlieb Buehler

Joseph Chrisman Coyne
Philip Winfred Davis
Donald Goodrich Denison, Jr.
Wellington Ballard Eler
James Cole Feldmann
Franklin Pratt Glueck

George Frank Glueck
Robert Francis Goodwin
Samuel Meeker Grafton
Charles Atwood Hamilton
Joseph Irish Hammond
William Milton Harbaugh, Jr.
George Carson Lennox
Warren Grant Leonard
Donald Wright MacFeeters
Preston Fairfax Marshall
Jean F. Mascuch
Matthew Krause Morris
Leonard Dalton Morrison
Herbert James Packer, Jr.
Eldon Martin Roemmele

Howard Elias Schaffer
William Edward Schwanda
Edwin Harold Scott
Harrison Niles Siebold
O. Leon Silbermann
Vernon Nelson Simmons, Jr.
William Wallace Steele, Jr.
Carl Longenberger Stieg
Edward Woodworth Stoebr
Bernard Elroy Tripp, Jr.
Waldso Rodman Turner
Hugh Gaston Van Der Veer, Jr.
Philip Ricord VanDuyne, Jr.
Herbert Vonnhof
James McCullough Walton

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Robert Clyde Albert
Charles Barnett Bayles
Richard Edwin Brown, Jr.
Richard Frank Clock
Bertram J. Cross, Jr.
Joseph MacKenzie Garden, B.A.
(*Acadia University*)
Spencer Ritner Griffith
Benjamin Logan Hummel
Robert Henry Ireland
Gilbert Mumper Keller
George Eric Lien
Donald Raymond Luster

Robert Edward Lyon
John Francis McQuillin
Charles Gutilius Myers
Edward P. Phillips
Alfred Williams Rowley
Francis George Shenton
Alfred Ludwig Trumpler
Robert Lloyd Ware
Charles Ernest West
Arthur Everett Wetherbee, Jr.
Robert Fairchild Wolfe
Robert John Wright

BACHELOR OF SCIENCE IN METALLURGICAL ENGINEERING

Warren Woodrow Ache
Ralston Gladstone Adamson
Elmer Smith Barnes
Edward Hileman Brindle
Robert Alexander Cary
John Francis Conwell
Charles Wesley Darby
Philip Greenawalt DeHuff, Jr.
Charles Harrison Dorsey, Jr.
Charles Harrison Fetzner
Fernand August Flory
Vernon Stevenson Gray, Jr.
Richard Christian Hess
David L'Hommedieu Holmes
John Jacob Hursh, Jr.
David Frederick Keiper
Fred Wagner Kern

Robert Farrar Koenig
Clifford Franklin Lincoln, Jr.
James Franklin Lobach, Jr.
Herman Edward Merz
William Norman Mills
Charles Ferdinand Monard
James Leslie Oberg
Maynard Harold Patterson
Joseph Edgar Pfaff
Charles Post Pulsford
Warren Hancock Richards
Joseph Bennevill Schrader
Elmer Michael Stefko
John Worrall Temple
Robert George Waite
Heinz Edgar Walther, Jr.

BACHELOR OF SCIENCE IN MINING ENGINEERING

Richard Bennett Jeffery
Richard Leon Johnson

William Charles Lewis

COMMISSIONS AS SECOND LIEUTENANTS IN THE OFFICERS'
RESERVE CORPS

MEMBERS OF THE GRADUATING CLASS

Infantry

Sylvester Demarest Beers	Preston Fairfax Marshall
Alfred VanSant Bodine, Jr.	J. Joseph McCluskey
Walter Randall Catching, Jr.	John Joseph McFadden
William Rowe Clark	Robert Russell Merwin
John Cochran	Robert Howard Miller
Robert Fulton Coleman	Jules Laurence Moreau
John Francis Conwell	Maynard Harold Patterson
Alfred Thomas Cox	Douglas Campbell Paul
Joseph Chrisman Coyne	Vivian Gaines Paul, Jr.
Edward Francis Dannemiller	Richard Frederic Pearce
John Erich Decher	Frederick David Pierce
Ambrose Graham Delany	Albert Edward Ponter, Jr.
Maynard Lake Diamond	Harry Mathew Randel
Charles Harrison Fetzner	Robert Joseph Reid
Richard Fred Fincke	Carl Hazard Richardson
Richard Spencer Gowdy	John Bradley Rush
Samuel Meeker Grafton	Terry Schiff
Spencer Ritner Griffith	William Dickinson Shields, Jr.
Charles Franklin Guilford	Edwin Harold Scott
Adolf Frederick Haffenreffer, Jr.	Bernard Alois Smith
Joseph Irish Hammond	Willard Johnson Thomas
James Rogers Harris, Jr.	William Burton Todd
Clifford Budd Heisler	Herbert Vonnhof
Joseph Boyd Kelley	Heinz Edgar Walther, Jr.
Loring Lane	

Ordnance

Robert Alexander Cary	Royal Vincent Mackey, Jr.
William Robert Csellak	John Francis McQuillin
Philip Greenawalt DeHuff, Jr.	Edward P. Phillips
Franklin Pratt Glueck	William Bernard Pohlman
Robert Stewart Grubmeyer	Wilbur Francis Schaffer, Jr.
William Milton Harbaugh, Jr.	Walter Morrison Schweder
Richard Carlyle Kelley, Jr.	John Worrall Temple
Robert Farrar Koenig	Hulme Willard Thomas
Warren Grant Leonard	Edward George Uhl
George Eric Lien	William Byron Wrigley
Clifford Franklin Lincoln, Jr.	Karl H. Zornig
Donald Wright MacFeeters	

Quartermaster

Robert Steven Bothé	Gardner Sletten
Albert James Collins	

UNDERGRADUATES

Infantry

John Anthony Dallen	Norman Charles Scarpulla
Gordon George Loveland	Samuel Foster Shireman
Harold Joseph Masem	Jacob Forney Young, Jr.
James Milnor Roberts, Jr.	

DEGREES

CERTIFICATES OF ELIGIBILITY FOR COMMISSIONS AS SECOND
LIEUTENANTS IN THE OFFICERS' RESERVE CORPS

(Commissions withheld because of the candidates' being under age)

MEMBERS OF THE GRADUATING CLASS

Infantry

Quentin R. Gangewere Keith

Ordnance

Bernard Altshuler
Fred Kornet, Jr.

Edward Miles Sharp

CERTIFICATE OF COMPLETION OF MILITARY
TRAINING COURSE

MEMBER OF THE GRADUATING CLASS

Ordnance

Warren Woodrow Ache

DEGREES CONFERRED ON FOUNDER'S DAY

OCTOBER 2, 1940

Degrees in Course

MASTER OF ARTS

Major in History

Karl Maynard Lehr, Ph.B. (*Muhlenberg College*)

MASTER OF SCIENCE

Major in Bacteriology

Albert James Cross, B.A. (*Lehigh University*)

Major in Biology

Walter L. Reinhart, B.S. (*Muhlenberg College*)

Major in Chemistry

William Hugo Brodnitz, B.S. (*Columbia University*)

Georges Elias Tabet, B.A., B.S. in Ch.E. (*American University at Cairo*)
(*Lehigh University*)

Major in Metallurgical Engineering

John Morgan Thomas, B.A. (*Lehigh University*)

BACHELOR OF ARTS

David George de Beauchamp
John Emmanuel Lagouros

John Randall Torrens

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Norman Jordan Haas	William Taylor Luce
Albert Bellows Harding	John James Nicol
Frank Howard Hewett, Jr.	Robert James Pearce
Frederick Juer	Henry Van Reed

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

Leonard Hastings Diehl, Jr.	Ralph Schilling Heller
Arthur Harold Harding	Gordon George Loveland

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Norman Charles Scarpulla

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Joseph Lewis Serrill, Jr.	Frank George Steinbrucker
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BACHELOR OF SCIENCE IN ENGINEERING PHYSICS

Aelfric James, Jr.

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

Frank George Binger	Malcolm Dutcher Ware
Otto V. Norvig	

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Robert Kingman Poetter

BACHELOR OF SCIENCE IN METALLURGICAL ENGINEERING

Warren Nethercott Hall

BACHELOR OF SCIENCE IN MINING ENGINEERING

Charles Emmerling Ahl, Jr.	David Earnshaw Cooper
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HONORS

HONORS ANNOUNCED ON UNIVERSITY DAY,
JUNE 10, 1940

GRADUATION HONORS

GRADUATED WITH HIGHEST HONORS

Alfred Thomas Cox
Norman Hammer
Russell Kowalyszyn
Jules Laurence Moreau

Anders Finch Myhr
Charles Frederick Rehman
James Francis Ryan, Jr.

GRADUATED WITH HIGH HONORS

Bernard Althshuler
Frank Lee Benedict, Jr.
Wellington Ballard Eler
John Giacobbe
Robert Ray Godard
Gilbert Mumper Keller
Robert Russell Merwin
Arthur Samuel Mickley
Norman Lester Morse

Robert Bauer Palmer
William Bernard Pohlman
Carl Hazard Richardson
Edward Miles Sharp
Gardner Sletten
William Burton Todd
Randall Benton Tucker
Edward George Uhl

GRADUATED WITH HONORS

Bernard Berkowitz
William Adrian Blum, Jr.
Robert Steven Bothé
Aaron House Brennesholtz
Louis John Gottlieb Buehler
Robert Prentiss Carter
Robert Alexander Cary
Walter Randall Catching, Jr.
William Robert Csellak
Richard Charles Gangwer
Stanley Ellis Gilinsky
Walter Grady Guy, Jr.
Frank Edwin Harper, Jr.
Richard Christian Hess
Robert Farrar Koenig
Theodore Leinbach Lenninger

Donald Raymond Luster
Donald Wright MacFeeters
Robert Dearborn Marsden
John Joseph McFadden
John Vincent McGuire
Edwin Haviland Miller
Charles Post Pulsford
Herbert Emil Rasmussen
Robert Bruce Spilman
George Sidney Sprague
Harold Francis Truchsess
Robert George Waite
Walter Joseph Wetherell
Raymond Robert White
John Lamar Worzel

GRADUATED WITH SPECIAL HONORS

Civil Engineering

Alfred Thomas Cox

English

Edwin Haviland Miller

William Burton Todd

Greek

Jules Laurence Moreau

Latin

Robert Bauer Palmer

Mechanical Engineering

Spencer Ritner Griffith

Arthur Everett Wetherbee, Jr.

Organic Chemistry

James Francis Ryan, Jr.

Philosophy

Randall Benton Tucker

HONOR GRADUATES IN THE RESERVE OFFICERS'
TRAINING CORPS

Infantry

William Rowe Clark

Robert Russell Merwin

Alfred Thomas Cox

Carl Hazard Richardson

John Erich Decher

Gardner Sletten

Ordnance

Robert Alexander Cary

Edward George Uhl

William Bernard Pohlman

HONORS ANNOUNCED ON FOUNDER'S DAY,
OCTOBER 2, 1940

Freshman and Sophomore Honors, 1939-1940

(Awarded to those members of the classes of 1942 and 1943 who made an average grade of 3.00 or higher during the scholastic year 1939-1940.)

FRESHMAN HONORS

Maynard Goodwin Arsove

Isaac Moyer Hunsberger

Lynn Conant Bartlett

Thomas Crawford MacAllister, Jr.

Robert Kingdon Beckwith

Arthur Forrest Mann

Charles Surface Bennett

John Joseph Meehan

Taylor Albert Birckhead

Robert Condit Moore

Frank Hugo Bower

John Haines Mueller

Samuel Breskman

Harold Russ Nace

Alexander Brkich

Hans Nelken

William Conner Brower

James Walter Niemeyer

Thomas Mathieu Buck

Preston Parr, Jr.

Arlington Ward Canizares

Philip Henry Powers, Jr.

Stanley Caplan

Robert Wilmar Pugh

William H. Clark, Jr.

Hugh Warren Richards

Charles Dwight Curtiss, Jr.

George Horace Ried

Samuel Jackson Davy

Robert Webster Saylor

Richard Kistler Eberts

William Dwight Schaeffer

Edward Adam Fehnel

William Lester Stump

Lewis Friedman

Walter Stockton Titlow, Jr.

Wheeler Gilmore

Walter Scott Tomkinson

Ludwig Edward Godycki, Jr.

Richard Rolland Waer

William Daniel Hayes

William Comstock Walter

Walter Russell Hoerner

Forwood Cloud Wiser, Jr.

William Bane Holberton

James William Woods

Fenwick Peck Horn

Franklin Haldeman Young

PRIZES

SOPHOMORE HONORS

George Beverly Benedict	William Jackson Meikle
William Milton Benesch	Tom Charles Mekeel
Jesse Oatman Betterton, Jr.	Robert Metzner
Welles Royce Bliss	Frederic Stuart Nolte
Alfred Bruce Brown	John Hugh Norwood
Irwin Russell Burkey	Lowell Kenneth Oliphant
Philip Guernsey Butts	David Emrys Richards
John Fulmer Clark, Jr.	John Marvil Roach
Robert Wesley Clark	Gordon Brown Robertson
John Lake Diamond	Charles Henry Schumacker
Jerome Richard Dorkin	Grendon Kenneth Sebold
Harry Jerome Friedman	Louis Everett Sharpe
Ernest Gamble, Jr.	Robert Niel Simonsen
Edwin Howard Klein	William James Skinner
Conrad Erwin Kluger	John Joseph Somers
Frederick Albert Krone	Robert Samuel Struble
Philip Lutters	Robert Gorman Taylor
Robert Mercier Maiden	Albert Leo Thalhamer
Paul William Marshall	Kurt Heinz Weber
Malcolm Findley McConnell, Jr.	Lee Robert White
Robert Charles McMichael	

PRIZES

PRIZES ANNOUNCED ON UNIVERSITY DAY, JUNE 10, 1940

WILLIAMS SENIOR PRIZES IN ENGLISH

First Prize, \$75, and Second Prize, \$25, divided between Edwin Haviland Miller, William Burton Todd

WILLIAMS SENIOR PRIZES IN PHILOSOPHY

First Prize, \$75—Randall Benton Tucker

WILLIAMS SENIOR PRIZES IN HISTORY AND GOVERNMENT

Second Prize, \$25—Russell Kowalyshyn

WILLIAMS JUNIOR-SENIOR PRIZES IN EXTEMPORE SPEAKING

First Prize, \$75—Frank Lee Benedict, Jr.
Second Prize, \$50—John Carlisle Walker
Third Prize, \$25—Norman Lester Morse
Honorable Mention—John Vincent McGuire

WILLIAM H. CHANDLER CHEMISTRY PRIZE, \$25—to the highest ranking senior in the curricula in chemistry and chemical engineering

James Francis Ryan, Jr.

AMERICAN INSTITUTE OF CHEMISTS MEDAL

James Francis Ryan, Jr.

JOHN B. CARSON PRIZE, \$50—for the best record in professional courses in civil engineering

Alfred Thomas Cox

PHILIP FRANCIS DUPONT MEMORIAL THESIS PRIZES IN ELECTRICAL ENGINEERING—for the best theses of graduate students in electrical engineering

First Prize, \$50—Charles Hoff Titus

Second Prize, \$25, divided between George William Klingaman,
Eric Weiss

HAROLD J. HORN PRIZES IN ELECTRICAL ENGINEERING PROSEMINAR

First Prize, \$10—Robert Ray Godard

Second Prize, \$5—Arthur Samuel Mickley

CORNELIUS PRIZE IN MECHANICAL ENGINEERING, \$100—to the senior in mechanical engineering adjudged to have profited most by his opportunities at Lehigh University

Robert Edward Lyon

AMERICAN SOCIETY OF CIVIL ENGINEERS JUNIOR MEMBERSHIP PRIZE

Alfred Thomas Cox

AMERICAN SOCIETY OF MECHANICAL ENGINEERS JUNIOR MEMBERSHIP PRIZE

John Francis McQuillin

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS STUDENT MEMBERSHIP PRIZE

Arthur Samuel Mickley

AMERICAN CHEMICAL SOCIETY AWARD—to the highest ranking senior in chemistry or chemical engineering

James Francis Ryan, Jr.

AUBERTINE WOODWARD WRIGHT LATIN PRIZE—for passing the senior comprehensive examination in Latin with distinction

Robert Bauer Palmer

AUBERTINE WOODWARD WRIGHT PRIZE, \$25—for exceptionally outstanding work in junior-senior Latin

Robert Bauer Palmer

**PRIZES ANNOUNCED ON FOUNDER'S DAY,
OCTOBER 2, 1940**

WILBUR SCHOLARSHIP, \$200—to the highest ranking sophomore

Alfred Bruce Brown

WILBUR PRIZES, FRESHMAN YEAR

Mathematics

First Prize, \$15—Isaac Moyer Hunsberger

Second Prize, \$10—Maynard Goodwin Arsove

English, \$15—Isaac Moyer Hunsberger

German, \$15—Lynn Conant Bartlett

PRIZES

WILBUR PRIZES, SOPHOMORE YEAR

Mathematics, \$10—Alfred Bruce Brown
English, \$10—William Jackson Meikle
Physics, \$10—Alfred Bruce Brown

WILLIAMS SOPHOMORE PRIZES IN ENGLISH COMPOSITION

First Prize, \$50—John Richard Polinsky
Second Prize, \$25—John Lake Diamond
Third Prize, \$15—David Emrys Richards

WILLIAMS JUNIOR PRIZES IN ENGLISH COMPOSITION

First Prize, \$50—Hugh Roswell Davidson
Second Prize, \$25—Thomas Reed Hunt
Third Prize, \$15—Stephen Kowalyszyn

WILLIAMS PRIZES IN INTRAMURAL DEBATING

First Prizes, \$60 each—William Filson Boore, Jr., Robert Gaylord Eitner
Second Prizes, \$40 each—Robert Parsons Whipple, John Dukes Wooters, Jr.

WILLIAMS FRESHMAN PRIZES IN EXTEMPORE SPEAKING

First Prize, \$50—Arnold Oscar Putnam
Second Prize, \$25—Lynn Conant Bartlett

ROBERT W. BLAKE MEMORIAL PRIZES IN GENERAL EDUCATION

First Prizes, \$20 each—Robert Kingdon Beckwith, Edward Adam Fehnel

ELECTRICAL ENGINEERING PRIZE, \$25—to the highest ranking sophomore in electrical engineering

Lee Robert White

WILLIAM H. CHANDLER CHEMISTRY PRIZES—to the highest ranking student in each class in chemistry and chemical engineering

Freshman Year, \$25—Stanley Caplan
Sophomore Year, \$25—Harry Jerome Friedman
Junior Year, \$25—John Daniel Mettler, Jr.

JOHN R. WAGNER AWARD, \$15—to the highest ranking student in mechanical engineering during his first two years

Frederic Stuart Nolte

ALUMNI JUNIOR PRIZES—to the highest ranking juniors in each of the three Colleges of the University

Arts and Science, \$25—Willard Andrew Litzenberger
Business Administration, \$25—Joseph Henry Quinn
Engineering, two prizes, \$25 each—John Daniel Mettler, Jr., Allen Herbert Zane, Jr.

ETA SIGMA PHI PRIZE, \$10—to the highest ranking student in sophomore collegiate Latin

Welles Royce Bliss

ALPHA KAPPA PSI MEDALLION—to the highest ranking junior in business administration

Joseph Henry Quinn

TAU BETA PI PRIZE (Slide Rule)—to the highest ranking freshman in engineering

Stanley Caplan

ETA KAPPA NU PRIZE (Engineer's Handbook)—to the highest ranking freshman in electrical engineering

Maynard Goodwin Arsove

PI TAU SIGMA MECHANICAL ENGINEERING PRIZE (Engineers' Handbook)—to the highest ranking freshman in mechanical engineering

Robert Webster Saylor

PI TAU SIGMA INDUSTRIAL ENGINEERING PRIZE (Engineers' Handbook)—to the highest ranking freshman in industrial engineering

Richard Charles Roth

PHI ETA SIGMA CUP—awarded for one year to the living group whose freshman (not fewer than five) have made the highest scholastic average for the year

Taylor House, Section D

INTERDORMITORY COUNCIL SCHOLARSHIP CUP—awarded to the dormitory section having the highest scholastic average for the preceding year

Taylor House, Section E

PHI SIGMA KAPPA SCHOLARSHIP CUP—awarded for one year to the fraternity having the highest scholastic average for the year

Pi Lambda Phi

TRUSTEES' SCHOLARSHIP CUP—awarded for one year to the living group having the highest scholastic average for the year

Leonard Hall

**Register of Students
1940-1941**

STUDENTS 1940-1941

GRADUATE STUDENTS

In the following list of graduate students, an entry such as "Major: Chemistry" signifies that the student has been admitted to candidacy for the master's degree with a major in the field indicated. An entry such as "Major*: Chemistry" signifies that the student has been admitted to candidacy for the doctor's degree in the field indicated.

- Agocs, William Bailey Bethlehem
B.S. in E.M. (*Lehigh University*). Major*: Physics.
- Aho, Toivo Otto Baltimore, Md.
A.B. (*Temple University*). Major: Metallurgical Eng.
- Albertine, Michael Victor Bethlehem
B.A. (*Moravian College*). Major: Education.
- Altmaier, John Martin Columbus, O.
A.B. (*Harvard University*). Major: Chemistry.
- Altshuler, Bernard Newark, N.J.
B.S. in Eng. Phys. (*Lehigh University*). Major*: Physics.
Graduate Assistant in Physics.
- Bailey, Joel Furness Bethlehem
B.S. in M.E., M.S. (*Purdue University, Lehigh University*).
- Bartholomew, Paul Hopkins Palmerton
B.S. in Ch.E. (*Lehigh University*). Major: Chemical Eng.
- Bartol, Catherine Mary Hazle Brook
B.S. in Ed. (*Indiana State Teachers College*).
- Baumann, Carl Daniel Reading
B.S. (*Albright College*). Major: Physics.
Graduate Assistant in Physics.
- Beazley, Russell Seibel Allentown
A.B. (*Muhlenberg College*). Major: History.
- Blum, William Adrian Bethlehem
B.S. in Ch.E. (*Lehigh University*). Major: Chemistry.
National Oil Products Company Fellow in Chemistry.
- Bollman, Philip D. Bath
B.S. (*Albright College*). Major: Education.
- Branch, John Nesquehoning
B.S. in Ch.E. (*Lehigh University*). Major: Mechanical Eng.
- Brisker, Sydney Hirsch Bethlehem
B.S. in I.E. (*Lehigh University*).
- Buchanan, Chester Howard Hellertown
B.S. in E.E., M.S. (*University of Vermont, University of Pittsburgh*).
Major*: Electrical Eng.
- Buerschaper, Robert August Bethlehem
B.S. in Eng. Phys., M.S. (*Lehigh University*). Major*: Physics.
Graduate Assistant in Physics.
- Burton, Leonard Pattillo Jasper, Ala.
A.B., M.A. (*University of Alabama*). Major*: Mathematics.
Graduate Assistant in Mathematics.

Callaghan, Joseph Calvin A.B., M.A. (<i>University of Michigan</i>).	Bethlehem
Campbell, James Duncan B.A. (<i>Gettysburg College</i>).	Bethlehem
Caum, Jesse Wilbur B.S. (<i>Pennsylvania State College</i>). Major: Metallurgical Eng. John H. Frye Fellow in Metallurgy.	Bellefonte
Connolly, John Robert B.S. in M.E., M.S., M.A. (<i>University of Illinois, Lehigh University</i>).	Bethlehem
Creitz, Mary Louise A.B. (<i>Cedar Crest College</i>). Major: Education.	Easton
Curtis, George Bartlett B.A., A.M. (<i>Wesleyan University, Columbia University</i>).	Bethlehem
Daney, Walter Francis Ph.B. (<i>Muhlenberg College</i>). Major: History.	Bethlehem
Daubenspeck, Benjamin Keck B.S. in Ch.E. (<i>Lehigh University</i>). Major: Chemistry. William L. Heim Research Fellow in Chemistry.	Allentown
Deits, Gordon Robert B.S. (<i>University of Washington</i>). Major: Civil Eng. American Welding Society Research Fellow in Civil Engineering.	Seattle, Wash.
Diamond, Theodore A.B., M.B.A. (<i>Lehigh University, Harvard University</i>). Major: Chemistry.	Brooklyn, N.Y.
Diefendorfer, Carolyn S. Ph.B. (<i>Muhlenberg College</i>)	Allentown
Ebert, Franklin E.	Lynnport
Eppes, James Van Deusen B.A., M.E. (<i>University of Virginia, Cornell University</i>). Major: Mechanical Eng.	Bethlehem
Farren, Daniel Irvin B.S. (<i>Muhlenberg College</i>). Major: Education.	Lehighnton
Feller, Gordon Stanley B.A. (<i>Muhlenberg College</i>). Major: Education.	Nazareth
Ferenczi, Louis Merrill B.S. in M.E. (<i>Lehigh University</i>). Major: Mechanical Eng. H. M. Byllesby Research Fellow in Mechanical Engineering.	Bayonne, N.J.
Ferrigan, James John B.A. (<i>Duquesne University</i>)	Allentown
Fister, Norman Bixler B.S. in Ed. (<i>Kutztown State Teachers College</i>). Major: Education.	Lincoln Park
Flinn, Alfred Richard B.S. (<i>Virginia Military Institute</i>). Major: Civil Eng.	Austinville, Va.
Fluck, William F. S. B.S. (<i>Muhlenberg College</i>). Major: Education.	Reading
Forstall, Walton, Jr. B.S. in M.E. (<i>Lehigh University</i>). Major: Mechanical Eng.	Rosemont
Fort, William Geoffrey Stacpoole B.S. in E.E. (<i>Georgia School of Technology</i>). Major: Electrical Eng.	Cornelia, Ga.
Freed, Claude Arthur B.S. in Ed. (<i>Muhlenberg College</i>).	Allentown

STUDENTS

- Freed, Paul Franklin Reading
 B.S. (*Muhlenberg College*). Major: Education.
- Frey, Elizabeth Drake Bethlehem
 A.B. (*Wellesley College*). Major: Education.
- Gaughran, Eugene Robert Lawrence Allentown
 B.A. (*Lehigh University*). Major: Bacteriology.
 Thorne Fellow in Biology.
- Geissinger, Sarah Anne Bethlehem
 A.B. (*Wilson College*). Major: English.
- Giacobbe, John Allentown
 B.S. in Ch.E. (*Lehigh University*). Major: Metallurgical Eng.
 Silver Research Committee Fellow in Metallurgy.
- Godfrey, Howard Johnson Bethlehem
 B.S. in C.E., M.S. (*Tufts College, Lehigh University*). Major*: Civil Eng.
- Green, Lloyd Frank Lakewood, O.
 B.S. (*Case School of Applied Science*). Major: Civil Eng.
 Garrett Linderman Hoppes Research Fellow in Civil Engineering.
- Greenough, Maurice Leighton Groveland, Mass.
 B.S. in E.E. (*Tufts College*). Major: Electrical Eng.
 H. M. Byllesby Fellow in Electrical Engineering.
- Gross, William Fagan Webster Groves, Mo.
 B.S. in Ch.E., M.S. (*University of Colorado, Lehigh University*).
 Major*: Chemical Eng.
 Gotshall Scholar.
- Guzzetta, Checchina Carmelina Easton
 A.B. (*Syracuse University*).
- Hafner, Arthur Henry, Jr. St. Johnsbury, Vt.
 Ph.B. (*Muhlenberg College*). Major: Education.
- Harris, Thomas Garde Pen Argyl
 B.S. in Ch.E., M.S. (*Lehigh University*). Major*: Chemistry.
 Devoe and Raynolds Company Research Fellow in Chemistry.
- Hartzell, Jacob Shaffer Nazareth
 B.S. in Bus. Adm. (*Lehigh University*)
- Hausman, Elmer Lewis Slatington
 B.S., M.A. (*Franklin and Marshall College, University of Pennsylvania*).
- Hawley, Roger Shinkle Boston, Ind.
 B.S. in Ch.E., A.B. (*Indiana Technical College, Earlham College*).
 Major: Chemistry.
 Graduate Assistant in Chemistry.
- Hechtman, Robert Aaron Seattle, Wash.
 B.S. in C.E., M.S. (*University of Washington*). Major*: Civil Eng.
 American Institute of Steel Construction Research Fellow.
- Heins, Earl Lambertville, N.J.
 B.S. in Ch.E. (*Lehigh University*). Major: Chemical Eng.
 Graduate Assistant in Chemistry.
- Hersey, John Brackett Milton, Mass.
 A.B., M.A. (*Princeton University*). Major*: Physics.
- Hightower, Carl Ernest Allentown
 A.B. (*Taylor University*). Major: Education.

LEHIGH UNIVERSITY

Hoffman, Donald Brooks Ph.B. (<i>Muhlenberg College</i>). Major: History.	Allentown
Hollenbach, Jane Elizabeth B.S. in Ed. (<i>Indiana State Teachers College</i>).	Harrisburg
Holme, Thomas Timings B.S. in M.E., M.S. (<i>Lehigh University</i>).	Bethlehem
Jackson, Thomas Edgar B.S. in M.E., M.S. (<i>Carnegie Institute of Technology, Lehigh University</i>). Major*: Mechanical Eng.	Bethlehem
Jacoby, Thomas Franklin B.S. in Ch.E., M.S. (<i>Lehigh University</i>). Major*: Chemistry. R. K. Laros Silk Company Research Fellow.	Fullerton
Jeffrey, Isabel Stuart B.A., B.S. (<i>Brown University, Simmons College</i>). Major: Psychology.	Saylesville, R.I.
Jones, Everett Lee B.A. (<i>Antioch College</i>). Major: English. Fellow in English.	Lawrence, Kans.
Kelchner, Mabel Lovina B.S. (<i>Albright College</i>). Major: Education.	Fleetwood
Keller, Joseph Adreon, Jr. B.S. in M.E. (<i>Georgia School of Technology</i>). Major: Mechanical Eng. Graduate Assistant in Mechanical Engineering.	Baltimore, Md.
Kiessling, William Theodore A.B. (<i>Washington University</i>). Major: Chemistry.	St. Louis, Mo.
Koehler, Truman Lester B.S., A.M. (<i>Muhlenberg College, University of Pennsylvania</i>). Major*: Mathematics.	Allentown
Kostenbader, Margaret Edwina B.S. in Ed. (<i>Muhlenberg College</i>). Major: History.	Wind Gap
Kreiss, Amos Fries B.S. in Ed. (<i>Kutztown State Teachers College</i>). Major: Education.	Slatington
Krick, Douglas Sterling B.S. (<i>Syracuse University</i>). Major: Education.	Easton
Kubo, Gerald Giro B.S. in C.E., M.S. (<i>University of Washington, Massachusetts Institute of Technology</i>). Major*: Civil Eng. American Institute of Steel Construction Fellow.	Tacoma, Wash.
Kuhns, William Joseph B.S. (<i>Muhlenberg College</i>). Major: Bacteriology. Institute of Research Fellow in Bacteriology.	Allentown
La Bar, Paul R. B.S. in E.M. (<i>Lafayette College</i>). Major: Education.	Bangor
Landis, Kenneth Maynard B.S. in Ed. (<i>Muhlenberg College</i>). Major: Education.	Hellertown
Lanternman, William Stanley, Jr. B.S., M.S. (<i>Lafayette College</i>). Major*: Physics. Graduate Assistant in Physics.	Easton
Laub, Norman Arnold B.S. (<i>Kutztown Teachers College</i>). Major: Education.	Northampton

STUDENTS

- Lee, Harold Kenneth Northampton
A.B. (*Lafayette College*).
- Lehman, Albert Llewellyn Bethlehem
B.S. (*Moravian College*). Major: Metallurgy.
- Levenson, Harold Samuel Allentown
B.S. in Ch.E., M.S. (*Lehigh University*). Major*: Chemistry.
Graduate Assistant in Chemistry.
- Madsen, Ingvald Elias Bethlehem
B.S. in C.E., M.S. (*Massachusetts Institute of Technology, Lehigh University*). Major*: Civil Eng.
Assistant Research Engineer.
- Mahla, Elbert Myron Lorain, O.
B.S. in Met.E., M.S. (*Lehigh University*). Major*: Metallurgical Eng.
Gotshall Scholar.
- Marcks, Helen Jane Allentown
Ph.B. (*Muhlenberg College*). Major: Spanish.
- McGrath, William Anthony Adams, Mass.
B.S. in Ch.E. (*Northeastern University*). Major: Chemical Eng.
Graduate Assistant in Chemistry.
- McHale, Paul Francis Bethlehem
B.S. (*University of Scranton*). Major: Metallurgy.
- Meerbott, William Keddle Jersey City, N.J.
B.S. in Chem. (*St. Peter's College*). Major: Chemistry.
Mutual Chemical Company of America Fellow.
- Merkel, Roy Thomas Sinking Spring
B.S. (*Franklin and Marshall College*). Major: Education.
- Moatz, Clarence Henry Northampton
B.A., B.D. (*Moravian College, Eastern Theological Seminary*).
Major: Psychology.
- Mode, Douglas Ewart Quakertown
M.S. (*University of Pennsylvania*).
- Moses, James Nicholson Bethlehem
B.S. (*Moravian College*). Major: Chemistry.
University Scholar.
- Murphy, Gerald Gordon Powell, Wyo.
B.S. (*Montana State College*). Major: Electrical Eng.
H. M. Byllesby Fellow in Electrical Engineering.
- Musso, Gino Joseph Slatington
B.S. (*Kutztown State Teachers College*). Major: History.
- Myers, Raymond Reeve New Oxford
B.A. (*Lehigh University*). Major: Chemistry.
- Myers, Richmond E. Emmaus
A.B., M.A. (*Moravian College, University of Pennsylvania*).
- Newhard, Harold Ethelbert Bethlehem
B.S., M.A. (*Moravian College, Lehigh University*).
- Obert, Joseph G. Lehighton
B.S. (*Lehigh University*). Major: Education.
- Ondra, Otakar Mor. Ostrava, Czechoslovakia
Dipl. Ing. in C.E., M.S. (*Technical University of Prague, Lehigh University*). Major*: Civil Eng.
Assistant in Civil Engineering.

- Opila, Francis Anthony Chicago, Ill.
B.S. in C.E. (*Armour Institute of Technology*). Major: Civil Eng.
Brink Fellow in Civil Engineering.
- Oswald, Harold Samuel Lehighton
B.S. (*Muhlenberg College*). Major: Education.
- Paal, Julius Bethlehem
B.D., Th.M. (*Reformed Theological Seminary, Budapest, Princeton Theological Seminary*). Major: Latin.
- Park, Eugene Andersonville, Ga.
A.B. (*University of Georgia*). Major: Mathematics.
Graduate Assistant in Mathematics.
- Paul, George Burr Palmerton
B.S. in I.E. (*Pennsylvania State College*). Major: Education.
- Pidus, Theodore Peter Bethlehem
B.A. (*Moravian College*).
- Poczter, Herman David Easton
- Powers, Chester Howard Elkins, W.Va.
B.S. in M.E. (*Purdue University*). Major: Mechanical Eng.
Graduate Assistant in Mechanical Engineering.
- Rasmussen, Herbert Emil Freehold, N.J.
B.S. in Ch.E. (*Lehigh University*). Major: Chemistry.
Student Chemical Society Fellow.
- Reber, Donald David Allentown
B.S. (*Franklin and Marshall College*). Major: Education.
- Reese, Truman Josiah Bethlehem
B.A. (*Moravian College*). Major: Education.
- Reichard, Robert Brighthill Catasauqua
B.S. in Ed. (*Kutztown State Teachers College*). Major: Education.
- Reichardt, Charles Henry Milltown, N.J.
B.S. in Chem. (*Rutgers University*). Major: Chemistry.
Graduate Assistant in Chemistry.
- Rhoda, Richard Noble Allentown
B.S. in Chem., M.S. (*University of Pittsburgh, Lehigh University*).
Major*: Chemistry.
- Ricker, Millard O'Neal Harrisburg
B.S. in Ch.E. (*Northeastern University*). Major: Chemistry.
Seton Leather Company Research Fellow in Chemistry.
- Ricks, James Benjamin Plandome, L.I., N.Y.
Ph.B. (*Brown University*). Major: Metallurgical Eng.
- Rinker, Robert Rolfe Bethlehem
B.S., M.A. (*Moravian College, Columbia University*).
- Roberts, Webster Charles Cleveland Heights, O.
B.S. (*Case School of Applied Science*). Major: Mechanical Eng.
- Rowland, Marion Clifford Lead, S.Dak.
B.S. in Met.E (*South Dakota School of Mines*). Major: Metallurgical Eng.
- Rupp, Pauline Barnhart Allentown
A.B. (*Cedar Crest College*). Major: English.
- Russell, George Cameron, Jr. Quincy, Mass.
A.B. (*Bates College*). Major: Geology.

STUDENTS

- Rynearson, Garn Arthur Van Nys, Cal.
 B.S. (*California Institute of Technology*). Major: Geology.
 New Jersey Zinc Company Research Fellow in Geology.
- Sabatine, John William Roseto
 B.S. (*Muhlenberg College*).
- Sargent, Lowrie Barnett, Jr. Fredericktown
 B.S. (*Washington and Jefferson College*). Major: Chemistry.
 Raybestos-Manhattan Research Fellow.
- Schlegel, Warren Christian Allentown
 A.B. (*Muhlenberg College*). Major: English.
- Schlenker, Paul Robert Bethlehem
 B.A. (*Moravian College*). Major: Mathematics.
- Sebring, Walter Hudson Tannersville
 B.S. (*Pennsylvania State College*). Major: Education.
- Shankweiler, Anna Gernert Allentown
 A.B. (*Cedar Crest College*). Major: History.
- Shearer, James Lamberson Bethlehem
 B.A. (*Lehigh University*). Major: History.
- Sheely, Gertrude Elizabeth Allentown
 A.B. (*Cedar Crest College*). Major: English.
- Shields, Lee Emilie Bethlehem
 B.A. (*Moravian College for Women*). Major: English.
- Shiffert, Kenneth Berlin Allentown
 B.S., M.S. (*Muhlenberg College, Lehigh University*). Major*:
 Physics.
 Graduate Assistant in Physics.
- Shingledecker, Cloyd Wilmer, Jr. Columbus, O.
 B.S. in Ch.E. (*Ohio State University*). Major: Metallurgical Eng.
- Silberman, O. Leon Bethlehem
 B.S. in I.E. (*Lehigh University*). Major: Metallurgical Eng.
- Simpson, Albert David Allentown
 B.S. (*Muhlenberg College*). Major: Physics.
- Sloane, Eugene Hulse Bethlehem
 A.B., M.A. (*Ohio State University*).
- Smith, Elmer Gould Bethlehem
 A.B. (*Lehigh University*). Major: Bacteriology.
 Institute of Research Fellow in Bacteriology.
- Smith, Marian Esther Bethlehem
 B.A. (*Moravian College for Women*). Major*: History.
- Smyser, John Moberley Bethlehem
 B.S. (*Massachusetts Institute of Technology*).
- Snyder, Gerald Clair Slatington
 B.S. (*Muhlenberg College*). Major: Chemistry.
 Corn Products Refining Company Research Fellow.
- Spitzmiller, Richard Ervin Grand Lake, Colo.
 B.S. (*University of Denver*). Major: Chemistry.
- Steele, James Harvey Belle Vernon
 B.A. (*Bethany College*). Major: Chemistry.
 Graduate Assistant in Chemistry.

- Steinhardt, Ralph Gustave, Jr. East Orange, N.J.
B.S. in Chem. (*Lehigh University*). Major: Chemistry.
- Steinman, Paul Franklin East Greenville
B.S. (*Ursinus College*). Major: Education.
- Stiles, Rollaston George Middlebury, Vt.
B.S. in E.E., M.S. (*University of Vermont*). Major*: Physics.
Graduate Assistant in Physics.
- Stout, Robert Daniel Bethlehem
B.S. (*Pennsylvania State College*). Major: Metallurgical Eng.
- Strauss, Harry Alfred, Jr. Allentown
B.S. (*Muhlenberg College*). Major: Education.
Fellow in Remedial Education.
- Strong, Frederick Carl, III Bethlehem
B.A. (*Swarthmore College*). Major: Chemistry.
- Strub, Paul Theodore Weinert Allentown
B.S. in Ch.E. (*Bucknell University*). Major: Chemistry.
Graduate Assistant in Chemistry.
- Tesmen, Arthur Boris Harbin, China
B.S. in Ch.E. (*University of Michigan*). Major: Metallurgical Eng.
- Tidd, Elbert DeForest High Bridge, N.J.
B.A. (*Lehigh University*).
- Todd, William Burton Freedom, Me.
A.B. (*Lehigh University*). Major: English.
Graduate Assistant in English.
- Tör, Sadun Servet Ankara, Turkey
E.M., M.E.M. (*Colorado School of Mines*).
Major: Metallurgical Eng.
- Tucker, Barclay Earl Bethlehem
B.S. in Ch.E. (*Lehigh University*).
- Turczyn, Mary Allentown
B.S. (*Kutztown State Teachers College*). Major: Education.
- Wall, Robert William Wesley Allentown
A.B. (*Bucknell University*).
- Warner, Cecil Francis Allentown
B.S. in M.E. (*Purdue University*). Major: Mechanical Eng.
H. M. Byllesby Research Fellow in Mechanical Engineering.
- Waters, Louis Addison, Jr. Syracuse, N.Y.
A.B. (*Harvard University*). Major: English.
Graduate Assistant in English.
- Watters, Louise Bethlehem
B.A. (*Swarthmore College*). Major: English.
- Weaver, Paul Oliver Lehighton
B.S. (*Ithaca College*). Major: Education.
- Weidner, Henry James Allentown
B.S. (*Muhlenberg College*). Major: Education.
- Weikel, Harold Stanley Quakertown
B.S. (*Ursinus College*). Major: Education.
- Wernett, Ada K. Allentown
B.S. (*Cedar Crest College*). Major: Education.

White, Raymond Robert	Bethlehem
B.A. (<i>Lehigh University</i>). Major: History.	
White, William Beckler	Waynesboro, Va.
B.A. (<i>Hampden-Sydney College</i>). Major: Mathematics.	
Wilker, Conrad Robert	Palmerton
B.S. (<i>Muhlenberg College</i>). Major: Education.	
Wilkinson, Norman Beaumont	Allentown
A.B., M.A. (<i>Muhlenberg College, University of Pennsylvania</i>).	
Williams, David Rowley	Glen Olden
B.S. in M.E. (<i>Drexel Institute of Technolcgy</i>). Major: Mechanical Eng.	
Graduate Assistant in Mechanical Engineering.	
Wint, Rufus Frederick	Lancaster
B.S. (<i>Franklin and Marshall College</i>). Major: Chemistry.	
Wynn, Ida Elizabeth	Lansford
B.S. in Ed. (<i>Kutztown State Teachers College</i>). Major: History.	
Yeager, Paul Milton	Wescosville
B.S. (<i>Muhlenberg College</i>). Major: Education.	
Ziegenfus, Gilbert Arthur	Allentown
B.S. in Phys. Ed. (<i>Michigan State College</i>). Major: Chemistry.	

UNDERGRADUATE STUDENTS

Arts.—Arts and Science	E.M.—Mining Engineering
Bus.—Business Administration	Eng.—Freshman Engineering
Ch.E.—Chemical Engineering	I.E.—Industrial Engineering
Chem.—Chemistry	M.E.—Mechanical Engineering
C.E.—Civil Engineering	Met.E.—Metallurgical Engineering
E.E.—Electrical Engineering	Phys.—Engineering Physics

Abbott, Henry Lawrence	E.E., '42	Fairmont, W.Va.
Achard, Francis Hermann, Jr.	Arts, '44	Westfield, N.J.
Adams, Donald Buxton	M.E., '43	Montclair, N.J.
Adams, John Marion	C.E., '42	Allentown
Adams, Vernon Howard	I.E., '42	Hempstead, N.Y.
Adler, Alfred Aron	E.E., '44	Philadelphia
Adrian, John, Jr.	Bus., '42	Orange, Mass.
Aldinger, Richard Carl	Bus., '44	Bethlehem
Allen, John Purdon	Ch.E., '43	Upper Montclair, N.J.
Ambrogio, Joseph Narcisco, Jr.	E.E., '42	Lansdowne
Anders, Walter Lesesne	Arts, '43	Bethlehem
Anderson, Christian Andrew	Ch.E., '44	Perth Amboy, N.J.
Anderson, David Beresford	Bus., '44	Larchmont, N.Y.
Anderson, Harry Wallis, Jr.	Bus., '44	Altoona
Anderson, James Lee	Bus., '41	New York, N.Y.
Anderson, Raymond Burr, Jr.	M.E., '42	Eggertsville, N.Y.
Andrews, George Gordon, Jr.	Bus., '41	Plainfield, N.J.
Andrews, Joseph Elliott, Jr.	Ch.E., '41	Pittsburgh
Anido, Victor Maurice, Jr.	Arts, '43	Valley Stream, N.Y.
Annett, Edward Burdett, Jr.	E.E., '41	Maplewood, N.J.
Apolenis, Charles John	Phys., '43	Allentown
Applegate, Norman Clarke, Jr.	C.E., '44	Riegelsville
Appleton, Robert Wylie	Bus., '43	Upper Montclair, N.J.
Arbizzani, John Peter	Met.E., '43	Bethlehem
Arbogast, Joseph Fredrick	Ch.E., '42	Harrisburg
Archbold, George Edward	Bus., '42	Ridgewood, N.J.
Archer, William Lippiatt	Bus., '41	Provincetown, Mass.
Armstrong, David Williston	E.E., '44	North Plainfield, N.J.
Arnold, Joseph Andrew	Ch.E., '42	Meadville
Arsove, Maynard Goodwin	E.E., '43	Rochester, N.Y.
Ashbrook, Richard Louis	Met.E., '44	Philadelphia
Ashley, Robert Edward	C.E., '42	Muskegon, Mich.
Atkins, Harry Montgomery	Arts, '42	Kittanning
Attwood, John Charles	Arts, '41	Chicago, Ill.
Ayers, Walter Hamilton	Ch.E., '44	Indiana
Bachman, Donald Noyes	Bus., '42	Allentown
Bachman, Gerald Herster	Bus., '44	Bethlehem
Bachtell, Elmer Percy, Jr.	I.E., '41	Hagerstown, Md.
Backensto, Elwood Bruce	Ch.E., '43	Emmaus
Bacskay, Stephen Alexander	M.E., '44	Fords, N.J.
Badger, Kern Churchill	Bus., '41	Ridgewood, N.J.
Bahnson, Frederic Newhall	Phys., '41	Bethlehem
Baiko, Boris	M.E., '41	Commack, L.I., N.Y.

STUDENTS

Bailey, Frank Harvey	Chem., '41	West Hartford, Conn.
Bailey, Robert Dudley	I.E., '43	Symmit, N.J.
Baker, Albert Lundy, Jr.	Ch.E., '44	Summit, N.J.
Baker, Craig Warren	Bus., '41	Albany, N.Y.
Baker, Robert Martin	Bus., '42	York
Baldwin, Clifford Clarence	C.E., '44	Philadelphia
Balough, Charles, Jr.	Arts, '43	Canton, O.
Balshi, Stephen Francis	Arts, '42	Bethlehem
Bannan, Thomas Sheridan	Arts, '44	Clearfield
Barber, Norman Miller	Bus., '41	New Rochelle, N.Y.
Bardagiy, Andrew Murad	Bus., '44	Jersey City, N.J.
Barker, Robert Scott	Bus., '42	Montclair, N.J.
Barnard, William Howard	E.E., '42	North Arlington, N.J.
Barnecott, David	Bus., '41	New York, N.Y.
Barr, Robert John	Ch.E., '44	Yonkers, N.Y.
Barrett, Myron Knox, Jr.	I.E., '44	Newark, N.J.
Bartholomew, Kenneth Robert	Arts, '41	Bethlehem
Bartholomew, Luther Roth	E.E., '43	Quakertown
Bartholomew, Robert Hopkins	Ch.E., '42	Palmerton
Bartlett, Charles Drummond, Jr.	Bus., '42	Bangor, Me.
Bartlett, Lynn Conant	Arts, '43	Bethlehem
Bartley, Arthur Kirke	Bus., '43	Forest Hills, N.Y.
Bartron, Lester Ray	Ch.E., '43	Bethlehem
Bashford, James Henry	Bus., '42	Drexel Hill
Bashford, Raymond Irving, Jr.	Bus., '43	Drexel Hill
Bauder, Burton Eberman	M.E., '43	Bethlehem
Bauder, Kenneth Caswell	Arts, '42	Lansdowne
Baumann, Kenneth Whitmore	Bus., '44	Chevy Chase, Md.
Beal, John Phillip, Jr.	Ch.E., '41	Montclair, N.J.
Bear, Willard Paul	E.E., '41	Slatington
Beauchamp, James Mercer, Jr.	I.E., '41	Staten Island, N.Y.
Beaumont, Warren Harding	E.E., '43	Summit, N.J.
Bechdolt, William Robert	Ch.E., '44	Bethlehem
Beck, Robert William, Jr.	I.E., '42	Johnstown
Beckel, Rodney Dennett	Met.E., '44	Allentown
Beckwith, Robert Kingdon	Ch.E., '43	Brooklyn, N.Y.
Beddows, Charles Roland, Jr.	Bus., '44	Westfield, N.J.
Bedell, Donald Warner	Ch.E., '41	Allentown
Beers, Jesse Franklin, Jr.	Arts, '42	Mahwah, N.J.
Belcher, Alfred Murray	Ch.E., '44	Mt. Vernon, N.Y.
Belcher, John Fullam	Bus., '42	Mt. Vernon, N.Y.
Bell, Thomas Robert, III	Ch.E., '41	Brookline
Bellinger, William Edwards	Bus., '43	Fort Plain, N.Y.
Bellis, Max William	E.E., '44	Rochester, N.Y.
Belser, William Edward	Bus., '44	Plainfield, N.J.
Bender, Donald Austin	Ch.E., '41	New York, N.Y.
Benedict, George Beverly	Arts, '42	Albany, N.Y.
Benesch, William Milton	Arts, '42	Baltimore, Md.
Bennell, David Langham	Bus., '44	Shaker Heights, O.
Bennett, Charles Surface	E.E., '43	Nazareth
Bennett, Robert Allan	M.E., '42	Northampton
Berg, Philip James	M.E., '44	Sewickley
Berg, Richard Joseph	Arts, '42	New Rochelle, N.Y.
Berg, Richard Turney	Arts, '43	Coraopolis Heights
Berger, Fred Willard	E.E., '41	Matamoras
Bergh, Charles Richard	Arts, '43	Ebensburg

Bergstresser, Neal Grube	Bus., '44	Hellertown
Beriont, John	Ch.E., '41	Linden, N.J.
Berlin, Bruce Atkisson	Arts, '43	Lansdowne
Berman, Frank Wolfgang	Met.E., '44	Cresskill, N.J.
Berman, Fred Francis	E.E., '44	Cresskill, N.J.
Bernasco, Richard Henry	Bus., '43	Trenton, N.J.
Betterton, Jesse Oatman, Jr.	Met.E., '42	Santa Ana, Cal.
Beucler, Harry Radford	Bus., '41	Bergensfield, N.J.
Bevan, John Richard	Met.E., '44	Pottsville
Bewley, George William	Bus., '44	Lockport, N.Y.
Bickley, Creighton Daniel, Jr.	Arts, '44	North Caldwell, N.J.
Biggs, Edward MacClellan, Jr.	E.E., '42	Garden City, N.Y.
Binder, James Kauffman	Arts, '41	Bethlehem
Binder, William Gotlob	Bus., '43	Steelton
Birckhead, Taylor Albert	E.E., '43	Baltimore, Md.
Bird, Robert Louis	Arts, '43	Bloomfield Hills, Mich.
Bishop, Edwin Samuel	M.E., '41	Bethlehem
Bixby, Carl Lyndon, Jr.	Arts, '41	Southport, Conn.
Black, John Charles	I.E., '44	Allentown
Blake, John Harvey	Bus., '44	Garden City, N.Y.
Blamire, Walter Peyton, Jr.	M.E., '41	Washington, D.C.
Blank, Howard Allen	Met.E., '44	Lehighton
Blanket, Mortimer Lawrence	Bus., '43	New York, N.Y.
Bleiler, James Harry	M.E., '43	Palmerton
Bleser, Richard Killington	I.E., '44	Lynbrook, N.Y.
Bleul, George John	C.E., '44	Northport, L.I., N.Y.
Bley, William Charles	Bus., '41	Hamburg, N.Y.
Bliss, Welles Royce	Arts, '42	Glen Ridge, N.J.
Blossom, Edward Ludlam, Jr.	Arts, '44	Baltimore, Md.
Blum, Murry Dattner	Bus., '44	Scranton
Boaks, Raymond John	Arts, '44	Plymouth, Mich.
Board, Robert David	I.E., '41	Brooklyn, N.Y.
Bobbé, Richard Arthur	I.E., '41	New York, N.Y.
Bodine, Edward Fulper	M.E., '42	Fairfield, Conn.
Bolyn, Alexander Hamilton	Bus., '43	Freeland
Bond, George William	Bus., '41	New York, N.Y.
Bonin, Joseph Frank	C.E., '44	Scranton
Bontya, John Michael	M.E., '41	Trenton, N.J.
Boore, William Filson, Jr.	Met.E., '42	Teaneck, N.J.
Bosserman, Charles Emmett	I.E., '44	Newport
Bostock, William Thomas, Jr.	Ch.E., '42	Roselle Park, N.J.
Boston, Robert Carlton	Ch.E., '43	Wilmington, Del.
Boucher, James Henry	C.E., '42	Catasauqua
Boughner, Donald Earl	Bus., '42	Scranton
Bourne, William George, III	M.E., '44	New York, N.Y.
Bowen, Sidney Royal, Jr.	E.E., '41	Mason City, Ia.
Bower, Frank Hugo	E.E., '43	Rutherford, N. J.
Bowers, Walter Bertolet	E.E., '42	Reading
Bowman, Robert McClarey	I.E., '42	Wyncote
Bown, Ralph, Jr.	Bus., '42	Maplewood, N.J.
Bowne, Sidney Breese, Jr.	C.E., '42	Glen Cove, N.Y.
Boyd, Hugh	M.E., '44	Doylestown
Boyer, Charles Edwin	Bus., '42	Bowmanstown
Boyer, Edward George	M.E., '43	Norristown
Boyer, Glenn Winfield	M.E., '43	Hershey
Boyer, Harry Lester, Jr.	Ch.E., '42	Drexel Hill

STUDENTS

Boyer, Warren Franklin	Ch.E., '41	Bowmanstown
Boyle, James John	Arts, '44	Cambridge, Mass.
Boynton, Horace William	Arts, '41	Roselle, N.J.
Bradford, Thomas Paisley	E.M., '43	Wheeling, W.Va.
Bradford, Warren Henry	Ch.E., '44	Mansfield, O.
Brawn, Earl Albert	I.E., '44	West Orange, N.J.
Brawn, Ray Edwin	I.E., '44	West Orange, N.J.
Breen, Alvin Leonard	Chem., '41	Portland
Brenker, George Alden	Bus., '42	Red Bank, N.J.
Brennan, Andrew Harrison	Bus., '43	Paterson, N.J.
Brenneman, Richard Henry	E.M., '43	Pottsville
Breskman, Samuel	Ch.E., '43	Philadelphia
Bricker, James Harman	Bus., '41	Westfield, N.J.
Bright, Richard Rieser	I.E., '42	St. Davids
Briody, Bernard Aloysius, Jr.	Arts, '41	Bethlehem
Britton, Everett Allan	Bus., '42	Wilmington, Del.
Brkich, Alexander	M.E., '43	Bridgeport, Conn.
Brod, Robert Eugene	Ch.E., '44	Bangor
Brooks, William Alexander	C.E., '42	Newark, N.J.
Brough, Samuel Ritchie, Jr.	I.E., '42	Greenwich, Conn.
Brower, George Harvey	Phys., '44	Allentown
Brower, John I., Jr.	I.E., '42	Plainfield, N.J.
Brower, William Conner	Phys., '43	Allentown
Brown, Alfred Bruce	Phys., '42	Essex Fells, N.J.
Brown, Carl Frederick, B.A. (Lehigh University)	Ch.E., '41	Bethlehem
Brown, Douglas MacGillvary	Arts, '41	Bethlehem
Brown, Edwin Augustus	Arts, '41	Bethlehem
Brown, George Hafer	Bus., '44	Bethlehem
Brown, George Hongenae	Bus., '42	New York, N.Y.
Brown, Herbert Albert	M.E., '41	Milford, Conn.
Brown, Rex Selden	E.E., '44	Cleveland Heights, O.
Brown, Robert Knox	Ch.E., '43	Chester
Brown, Robert Nash	I.E., '41	Elizabeth, N.J.
Brownlee, Donald Henry	M.E., '44	New York, N.Y.
Brubaker, John Henry, Jr.	C.E., '43	Easton
Bruen, James Harvey, Jr.	Bus., '42	Morristown, N.J.
Brundage, Frank Taylor, Jr.	M.E., '42	Norwalk, Conn.
Brune, Robert	Bus., '42	Brooklyn, N.Y.
Bruns, Carl Robert	Bus., '44	New Rochelle, N.Y.
Bryan, John Harvey, Jr.	I.E., '41	Westfield, N.J.
Buchman, Myron Isaac	Arts, '43	Brooklyn, N.Y.
Buck, Thomas Mathieu	M.E., '43	Philadelphia
Buczynski, Joseph John, Jr.	Ch.E., '44	Exeter
Bugbee, Alvin Newton, Jr.	C.E., '44	Catasauqua
Buhrig, William Thomas	Ch.E., '43	Mt. Vernon, N.Y.
Buncke, Harry Jacob, Jr.	I.E., '44	Rumford, Me.
Bunning, Herbert Edward	I.E., '43	Bronxville, N.Y.
Burchill, Robert Charles	Bus., '43	Allentown
Burgers, George Warren	Ch.E., '43	Grantwood, N.J.
Burgio, John	E.E., '42	Caldwell, N.J.
Burgy, Marion Clayton	Ch.E., '41	Peoria, Ill.
Burkavage, William Joseph	C.E., '41	Scranton
Burke, David Warden, Jr.	Arts, '41	Pleasant Ridge, Mich.
Burkey, Irwin Russell	I.E., '42	Hamburg
Burroughs, Robert Forrest, Jr.	Bus., '43	Pennington, N.J.

Burrus, John Henry, II	Bus., '43	Scranton
Buser, Richard Alvin	Met.E., '41	McKeesport
Bushey, Thomas Lee	I.E., '43	Haddonfield, N.J.
Bushwaller, Charles Robert	Bus., '41	Honesdale
Buss, Earl Roland, Jr.	E.E., '44	Easton
Buss, James Harvey, II	Arts, '43	Elmhurst, N.Y.
Bussmann, George John	Bus., '44	New Haven, Conn.
Butler, Frederick Cadwell	I.E., '41	Honesdale
Butler, Paul Harold, Jr.	M.E., '41	Chevy Chase, Md.
Butts, Philip Guernsey	Arts, '42	Bethlehem
Byrne, Arthur George	Arts, '43	Great Neck, N.Y.
Byrne, Robert Emmett, Jr.	Ch.E., '44	New York, N.Y.
Caemmerer, Robert	M.E., '41	Westwood, N.J.
Caldwell, Solomon Pusey	I.E., '43	West Grove
Callahan, James Holmes	Ch.E., '44	Media
Camarda, Frank Vincent	Ch.E., '44	Plainfield, N.J.
Canizares, Arlington Ward	C.E., '43	Wayne
Caplan, Harold	Arts, '41	Allentown
Caplan, Stanley	E.E., '43	Allentown
Caproni, John Daniel	I.E., '43	Spring Glen, Conn.
Carcione, Anthony Ralph	Arts, '41	Bethlehem
Carl, Paul Revere, Jr.	Ch.E., '43	Paulsboro, N.J.
Carpenter, Peter	Bus., '42	Corning, N.Y.
Carrigan, David Joseph	Arts, '44	Lansdale
Carroll, Gerald Vincent	Arts, '43	Meriden, Conn.
Carroll, John Langland	I.E., '44	Meriden, Conn.
Carter, Charles Henry, Jr.	Chem., '41	Tamaqua
Carter, Wayne Hanley, Jr.	Arts, '43	Plainfield, N.J.
Casey, Kevin	Bus., '44	Waterford, Conn.
Castiello, Richard Edward	M.E., '44	Bethlehem
Caulk, Lewis Jones	Bus., '43	Pasadena, Cal.
Cavanaugh, Edward Jerome	M.E., '43	Forty Fort
Caverly, Robert James	Bus., '41	South Orange, N.J.
Cella, John George	Ch.E., '44	Baldwin, L.I., N.Y.
Chafey, James Edward	Met.E., '42	Clayton, N.J.
Chamberlain, Boyd Daryl	E.E., '43	Shamokin
Chamberlain, Harvey Hine	E.E., '41	Maplewood, N.J.
Chamberlain, Robert Elmer	M.E., '42	Lyndhurst, N.J.
Chandler, Henry Deshons	Bus., '41	Brooklyn, N.Y.
Chapin, Warren Blanchard	Bus., '43	Westfield, N.J.
Charest, C. Norman	E.M., '44	Hazleton
Chase, Hazen Park	Bus., '42	Holyoke, Mass.
Chase, Wilbur, Jr.	Bus., '41	Chatham, N.J.
Chidsey, Francis Arndt, Jr.	Bus., '43	Wayne
Christian, John	E.E., '44	Philadelphia
Christine, William Creveling	Arts, '43	Stroudsburg
Ciaffardini, Aldo Nicholas	M.E., '44	Bethlehem
Clain, Charles Edward	M.E., '41	Ridgewood, N.J.
Clark, Albert, Jr.	Chem., '42	Nanticoke
Clark, Gordon Manson	M.E., '42	Hamden, Conn.
Clark, John Fulmer, Jr.	E.E., '42	Wyomissing
Clark, Nelson Raymond, Jr.	I.E., '42	LaGrange, Ill.
Clark, Robert Wesley	I.E., '42	Lakewood, N.Y.
Clark, William Henry, Jr.	E.E., '43	Rutherford, N.J.
Clark, William Lawrence	Met.E., '41	Mountain Lakes, N.J.
Clark, William Lee	Bus., '42	Garden City, L.I., N.Y.

STUDENTS

Clarke, Charles Victor	I.E., '41	Staten Island, N.Y.
Clarke, Harry Saint Clair	Bus., '43	Jamestown, R.I.
Clemmer, Joel Gerhard, Jr.	Bus., '44	Glenside
Clemmey, John Lewis, Jr.	Bus., '44	Fall River, Mass.
Clewell, Willard Stanley	Ch.E., '42	Bethlehem
Cliff, Richard Henry, Jr.	M.E., '42	South Temple
Clokey, Allison Walter	I.E., '42	Rutherford, N.J.
Cloud, Fenton Rulon	I.E., '42	Norristown
Cochran, John Kerr	I.E., '44	South Orange, N.J.
Codding, Charles Nelson, III	C.E., '44	Beverly, N.J.
Coffey, Edward John, Jr.	M.E., '42	Bethlehem
Colando, Andrew Charles	Arts, '44	Yardley
Cole, Charles Benjamin	Ch.E., '41	Union, N.J.
Coleman, Robert Henry	Bus., '42	Flushing, N.Y.
Coles, Dudley	C.E., '44	Newark, N.J.
Collmann, Irving Reid	Arts, '44	Wilkes-Barre
Collmann, Warren Xavier	Arts, '43	Wilkes-Barre
Colwell, Oakes Maxcy	M.E., '43	Caldwell, N. J.
Compton, Joseph Gordon	E.M., '44	Flushing, N.Y.
Compton, Lawrence Hamlin	I.E., '42	Bethlehem
Conchar, Barton	I.E., '41	Millburn, N.J.
Conforte, Jon	Bus., '43	Stoney Brook, L.I., N.Y.
Congelton, Douglas Metcalf	Bus., '44	New Hartford, N.Y.
Conklin, Alan Holding	Arts, '42	Upper Montclair, N.J.
Conklin, Charles Russell, Jr.	Chem., '44	Catonsville, Md.
Conneen, Joseph Lawrence	Bus., '42	South Orange, N.J.
Conover, Charles Henry	Arts, '41	Pittsburgh
Conover, Edgar Russell, Jr.	M.E., '43	Fort Washington
Conrad, Charles Middleton	Bus., '43	Barnegat, N.J.
Contreras, Wenceslao Jose	E.E., '41	Bethlehem
Conway, William Martin	E.E., '44	Rutland, Vt.
Cooke, John Stairs	I.E., '44	Short Hills, N.J.
Cooke, Oakley Watts, Jr.	Bus., '43	Caldwell, N.J.
Cooper, Ronald Loyal	Bus., '44	Little Neck, N.Y.
Coopey, George Semmer	Met.E., '41	Nanticoke
Corbett, Albert Dimery, Jr.	M.E., '44	Bloomfield, N.J.
Cordrey, James Milbourne	Ch.E., '44	Salisbury, Md.
Coriell, Jack	Phys., '44	Elizabeth, N.J.
Cornelius, Alfred Joseph	C.E., '44	New Rochelle, N.Y.
Cornish, Arthur John	Ch.E., '43	Roslyn Heights, L.I., N.Y.
Corpening, Maxwell Michaux, Jr.	E.E., '42	Chicago, Ill.
Corsa, Pinckney Morrison	C.E., '44	Narberth
Corson, John Hughes	Met.E., '43	Oakmont
Cortright, Martin Harrison	Bus., '41	Meshoppen
Cortright, Theodore Robert	E.E., '42	Berwick
Corwin, Henry Hobart	Arts, '43	Bridgeport, Conn.
Cory, Samuel Isaac, Jr.	Ch.E., '42	Towaco, N.J.
Cosford, William Clark	Bus., '43	Westmount, Quebec, Can.
Courtney, Howard Wright, Jr.	Bus., '44	Westfield, N.J.
Coutts, Robert Lloyd, Jr.	Bus., '43	Morristown, N.J.
Cowin, Roy Burford, Jr.	Arts, '43	Bethlehem
Cox, David Frederick	E.E., '44	Cleveland Heights, O.
Cox, Samuel Robert	Ch.E., '41	Berwyn
Craig, Alexander Mahon, Jr.	Bus., '41	South Orange, N.J.
Craig, Bruce	Bus., '44	Bloomfield Hills, Mich.
Craig, Robert	Bus., '42	Bloomfield Hills, Mich.

Creidenberg, Carl	Arts,'42	New York, N.Y.
Croake, Thomas James	M.E., '44	South Orange, N.J.
Croft, Willard Long	I.E., '44	Trenton, N.J.
Croot, Lloyd Alexander	Bus., '43	North East
Cross, Samuel Stephen, Jr.	Met.E., '41	Newtown Square
Crouse, Charles Leslie, Jr.	Bus., '41	Johnstown
Croushore, John Frederick	Arts, '41	Bethlehem
Crowe, William James	Ch.E., '44	Haworth, N.J.
Cullen, Robert Emmett, Jr.	Ch.E., '42	Kennett Square
Culliney, John Edgar, Jr.	Bus., '41	Bethlehem
Culliney, Niel Stahley	Arts, '43	Bethlehem
Cunningham, Harold Arlington	Ch.E., '44	Trenton, N.J.
Cunningham, Streit Wakefield	C.E., '44	Washington, D.C.
Cunningham, Thomas Patrick, Jr.	C.E., '41	Richmond Hill, L.I., N.Y.
Curran, John Philip	Arts, '42	Bridgeport, Conn.
Curtis, John Seaton	M.E., '43	Youngstown, O.
Curtiss, Charles Dwight, Jr.	C.E., '43	Chevy Chase, Md.
Czapko, Raymond Daniel	Arts, Spl.	Allentown
Cziguth, Frank Peter	Bus., '42	Allentown
Dabb, William Robert	E.E., '44	Elizabeth, N.J.
Dafter, Edwin Harold, Jr.	Ch.E., '43	Overbrook Hills
Danshaw, William	E.E., '41	Lansford
Darcy, David Keene	I.E., '44	Rockville Centre, N.Y.
Davidson, Charles Parker, III	I.E., '42	Clarks Green
Davidson, Hugh Roswell	Phys., '41	Rutherford, N.J.
Davies, Donald Henry	Bus., '43	Allentown
Davis, Courtland Van Horn, Jr.	Ch.E., '44	Plainfield, N.J.
Davis, Edward Stowman	Ch.E., '43	Philadelphia
Davis, James Edward	Bus., '42	Taylor
Davis, Richard Murray Francis	E.E., '44	Butztown
Davis, Richard Stoliker, Jr.	Bus., '41	Palisade, N.J.
Davis, Robert Nation	Bus., '43	Scarsdale, N.Y.
Davidson, Robert Edwin	Ch.E., '44	McKeesport
Davy, Samuel Jackson	E.E., '43	New Castle
Dawless, William Sampson	Bus., '42	Hamden, Conn.
Dawson, John Montgomery	Bus., '44	Norristown
Day, Kenneth Irving	E.E., '44	Maplewood, N.J.
Daze, Louis Rudolph	Bus., '43	Carteret, N.J.
Deach, John Joseph, Jr.	E.E., '44	Pottsville
Dech, Robert Wagner	Bus., '41	Bethlehem
Deckard, Robert Carl	Ch.E., '44	Marysville
DeCowsky, George Nestor	E.E., '42	Pennsburg
Deehan, Bernard William	Bus., '43	Belleville, N.J.
DeGiacomo, Gene Michael	C.E., '41	Port Chester, N.Y.
de Grouchy, John Goodfellow	Bus., '43	Upper Montclair, N.J.
Dehm, David Robert	M.E., '41	Elyria, O.
Deifer, Warren Edwin	I.E., '41	Allentown
de Jongh, Henry Edward	E.E., '44	Brooklyn, N.Y.
Dellwig, Louis Field	Arts, '43	Westmoreland Hills, Md.
De Long, William Thomas	Met.E., '43	Bethlehem
Dennis, Harry Grover	Bus., '42	Southbury, Conn.
Dennis, Jack Redding	E.E., '41	Pen Argyl
Descheemaeker, August	Ch.E., '41	Hanover
Detwiler, Ward Arnold, II	Bus., '42	Grosse Pointe, Mich.
De Valve, Herbert Covert, Jr.	E.E., '44	Baldwin, N.Y.
Deveraux, Harold Daniel	Ch.E., '43	Shamokin

STUDENTS

Devitt, John Edmund	I.E., '43	Mountain Top
Diamond, John Lake	Arts, '42	Bethlehem
Dick, Charles Joseph	Ch.E., '43	Bethlehem
Diefenderfer, Carson Freyman	C.E., '44	Fullerton
Dieffenbach, Alton Paige	E.E., '41	Duryea
Dieffenbach, Leo Worth	Bus., '43	Lopez
Diehl, Edward Lewis	C.E., '44	York
Dieringer, Laurence Fred	Ch.E., '41	Dumont, N.J.
Dieter, Robert Frederick	Ch.E., '44	Port Washington, N.Y.
Dietz, Richard Milton	M.E., '41	New York, N.Y.
Dimmich, Robert Carl	I.E., '41	Bethlehem
Dimmick, Ray Robert	Arts, '44	Hellertown
Dirkes, Frank Rodney, Jr.	Bus., '43	Lynbrook, N.Y.
Dix, Warren Richard	Met.E., '44	Little Falls, N.J.
Dodson, Robert Lester, Jr.	Bus., '44	Rutherford, N.J.
Dominguez, Ezequiel Chavez, E.M. (University of Chile)	Met.E., '41	Cañete, Chile
Domlesky, Leonard Albert	C.E., '41	Minersville
Donahue, James Joseph, Jr.	Bus., '43	Garden City, N.Y.
Donahue, John Francis	Met.E., '44	Garden City, N.Y.
Donato, Frank Thomas	Met.E., '44	Dunmore
Doney, Robert Henry	I.E., '44	Pen Argyl
Doniger, William Wolfe	Bus., '44	Cedarhurst, N.Y.
Donohoe, Howard Vane	Arts, '41	Drexel Hill
Dorkin, Jerome Richard	Arts, '42	Camden, N.J.
Doster, Robert Walper	Arts, '42	Bethlehem
Downs, John Vance	Bus., '41	Philadelphia
Doxsey, John Evans	I.E., '44	Shaker Heights, O.
Dragone, Rosario Roy	C.E., '43	Brooklyn, N.Y.
Drustrup, Thomas Grebe	Ch.E., '41	Upper Black Eddy
Duane, James Joseph, Jr.	Bus., '42	Flushing, L.I., N.Y.
Dubin, Alan Frederick	Chem., '44	New Rochelle, N.Y.
Dudley, John Herren	M.E., '42	McKeesport
Duelly, Jack Franklin	E.E., '44	East Orange, N.J.
Duggan, Kenneth Dwight	Arts, '42	Hastings-on-Hudson, N.Y.
Duncan, Roy Leslie, Jr.	M.E., '42	West Hartford, Conn.
Dunham, Willard Wilson, Jr.	Chem., '41	Fords, N.J.
Dunigan, Francis Joseph	M.E., '44	Harrisburg
Dunn, Frank Rothwell, Jr.	Ch.E., '41	Philadelphia
Dunwoody, James, Jr.	I.E., '43	Eric
Dutton, Charles Bockoven	I.E., '42	Morristown, N.J.
Dyer, Donald Penfield	Bus., '43	Belmont, Mass.
Eadie, Donald	E.E., '41	Morristown, N.J.
Eastlake, Donald Eggleston, Jr.	Bus., '42	Ridley Park
Eberts, Richard Kistler	Arts, '43	Bethlehem
Eckert, Russell William	Ch.E., '44	Hellertown
Edwards, Charles Taylor	Arts, '41	Bethlehem
Edwards, Edward Walter	Ch.E., '43	Batavia, N.Y.
Edwards, Leonard Harden	I.E., '41	Bethlehem
Edwardsen, Horace Buck	Arts, '44	Glen Ridge, N.J.
Egan, Bernard John	E.E., '44	Emporium
EGGE, Willet Ellsworth, Jr.	Chem., '43	Allentown
Eichlin, William Harrison, Jr.	M.E., '44	Easton
Eisele, William Adolph	E.E., '42	West Orange, N.J.
Eisenhart, Larry Ray	Met.E., '42	Bethlehem
Eisenhart, Luther William	I.E., '44	Bethlehem

Eisner, William Stanley	Ch.E., '43	South Orange, N.J.
Eitner, Robert Gaylord	Bus., '42	Summit, N.J.
Elliott, Arthur Henry, Jr.	Arts, '44	London, England
Elliott, George Earl, Jr.	Ch.E., '42	Washington, D.C.
Elliott, Herbert Paul, Jr.	Bus., '41	Pelham, N.Y.
Ellsworth, Stuart Marsh, Jr.	Arts, '44	Central Village, Conn.
Elmes, Badgley Allen	I.E., '43	Ridley Park
Elmes, Carl Albright	Bus., '44	Ridley Park
Endicott, Somers Harrison, Jr.	Met.E., '42	Pleasantville, N.J.
Engle, Robert Cassel	I.E., '42	Trenton, N.J.
Enstine, Raymond Wilton	Bus., '44	Southampton, L.I., N.Y.
Enterline, Stevenson Monroe	M.E., '41	Ashland
Epstein, Danal Paul	Bus., '44	New York, N.Y.
Ernest, William Allen	E.E., '44	Maplewood, N.J.
Estrada, Paul Pugh	Bus., '42	Havana, Cuba
Evans, Edward Gordon	I.E., '42	Scranton
Evans, Vernon	Bus., '43	Fort Benning, Ga.
Eways, Musa Joseph	M.E., '43	Reading
Ewing, Buchanan	Arts, '42	Trenton, N.J.
Ewing, Robert Henry	Phys., '43	Tulia, Tex.
Faber, Norman Joseph	Ch.E., '43	Trenton, N.J.
Falco, Paul Sebastian	C.E., '44	Elizabeth, N.J.
Farrand, Henry Carroll	Bus., '42	Bloomfield, N.J.
Farrell, William Bartholomew, Jr.	Bus., '44	Great Neck, N.Y.
Fehnel, Clarence Franklin, Jr.	Bus., '43	Nazareth
Fehnel, Edward Adam	Chem., '43	Bethlehem
Feigley, Donald Malcolm	Arts, '44	Quakertown
Feigley, William Johnson	Ch.E., '41	Quakertown
Felch, Robert Irving	I.E., '41	Hyde Park, Mass.
Felt, Frank Edward	Bus., '44	Jamestown, N.Y.
Fenstermacher, Richard Kocher	Chem., '44	Allentown
Ferdinand, Albert Guy	Arts, '44	Freeland
Ferguson, Frank Harvey	Phys., '41	Philadelphia
Ferland, Clement Roger	Arts, '42	Middlebury, Vt.
Ferrell, Blaine Donald	Ch.E., '44	Roslyn
Ferris, George Schermerhorn, Jr.	I.E., '43	North Tarrytown, N.Y.
Fetske, William August	M.E., '42	Elizabeth, N.J.
Fetter, Edmond Crawford	Bus., '42	Media
Fiedler, Kenneth Edward	Bus., '42	Garden City, N.Y.
Fielder, Kenneth Lewis	Ch.E., '41	New York, N.Y.
Figueroa, Roy Norman	Bus., '44	Garden City, N.Y.
Finch, Chester Lee, Jr.	I.E., '43	Washington, D.C.
Findorff, John Reeve	Bus., '41	Madison, Wis.
Finkle, Stephen Hopkins	Met.E., '42	Bethlehem
Finn, Robert Ernest	I.E., '41	Wyncote
Finnerty, Edward Thomas	Arts, '44	Millville, N.J.
Finney, William Frederick, Jr.	Bus., '43	Plainfield, N.J.
Fischer, Arthur Louis	Arts, '42	Plainfield, N.J.
Fischer, Donald Tatum	Arts, '44	Beverly, N.J.
Fisher, Charles William	M.E., '44	Hammonton, N.J.
Fisher, Ira Lewis	Bus., '43	Brooklyn, N.Y.
Fisher, John Charles	Bus., '41	Hammond, Ind.
Fisher, Robert Joseph	C.E., '43	Oreland
Fisher, William Henry	Bus., '44	Philadelphia
Fitch, Jack Clifford	Ch.E., '44	Scranton
Fitzell, Paul Boris	Bus., '42	New Britain, Conn.

STUDENTS

Fleischer, Thomas	M.E., '42	Indianapolis, Ind.
Flemming, Dwight John	E.E., '44	Newburgh, N.Y.
Flick, James Henry	Bus., '43	Bethlehem
Flueso, Harry William	Bus., '42	Allentown
Foley, William Francis	Bus., '41	Bridgeport, Conn.
Folwell, Nathan Thomas	Bus., '41	Allentown
Forner, Ray Henry	Chem., '44	Catasauqua
Forshay, Robert Field	Bus., '42	Hempstead, N.Y.
Forster, Robert Henry	Bus., '42	Elizabeth, N.J.
Forsyth, John Burr	Bus., '44	Red Bank, N.J.
Forsyth, Robert Henry	I.E., '42	Red Bank, N.J.
Fortosis, Anthony Constantine	Bus., '44	Bethlehem
Foss, Albert Canute, Jr.	E.E., '41	Ramsey, N.J.
Foster, Albert Wood	Bus., '42	Philadelphia
Foster, Charles Hatherly	I.E., '44	Shaker Heights, O.
Foster, Charles Huff, Jr.	Ch.E., '44	Cheltenham
Foster, Donald Thompson	Bus., '42	Scranton
Foster, Harold Earl	Bus., '42	Philadelphia
Foster, Richard MacDonald	Ch.E., '42	Bethlehem
Foust, Philip Gray, Jr.	Ch.E., '41	Wilkes-Barre
Fox, Oscar Edwin, Jr.	I.E., '44	Reading
Franck, Kay Teddy	M.E., '44	Hackensack, N.J.
Frantz, Vincent Alan	M.E., '41	Pleasant Valley
Frederick, John Adam, Jr.	Bus., '42	Catasauqua
Fredrick, William Rue	Bus., '42	Cranford, N.J.
Fredrickson, Roy Howard	E.E., '41	Hillside, N.J.
Freed, Charles William, Jr.	Arts, '42	Quakertown
Freed, Dale Youngman	Bus., '44	Williamsport
Freeman, Robert High	M.E., '43	Reading
Freemann, Richard Zern	Bus., '43	Narberth
Frey, Hugh Bartley, Jr.	E.E., '43	Dunellen, N.J.
Frey, William Snively	Bus., '44	York
Friedman, Harry Jerome	Ch.E., '42	Throop
Friedman, Lewis	Arts, '43	Belmar, N.J.
Fritsch, Paul Warren, Ph.B.	E.E., '42	Allentown
<i>(Muhlenberg College)</i>		
Froebel, Guenther Hilmer, Jr.	M.E., '44	Swarthmore
Frost, Edward Lyster	Met.E., '44	Kenmore, N.Y.
Fry, Mervin James	Arts, '41	Bethlehem
Fry, William Earl	I.E., '41	Danville
Frye, Filmore Oliver	Bus., '41	Tower City
Fuller, Robert Watson	I.E., '43	Bethlehem
Fuller, William Whitslar	I.E., '43	Cleveland Heights, O.
Fulton, Albert Clifton	M.E., '44	Kenoza Lake, N.Y.
Funk, Andrew Ernest, Jr.	Bus., '44	White Haven
Funk, George Ehrenfeld	C.E., '44	Hollidaysburg
Gabuzda, George Joseph, Jr.	Arts, '41	Freeland
Gabuzda, Joseph Cyril	E.E., '43	Freeland
Gaedcke, Walter Herman	Bus., '42	Roselle Park, N.J.
Gahagan, Philip James	I.E., '44	Bethlehem
Gailey, Robert King	Ch.E., '42	Niagara Falls, N.Y.
Gallagher, John Wilson, Jr.	Bus., '43	Brooklyn, N.Y.
Galli, James Henry	C.E., '43	Portland, Me.
Gallo, Michael Carmine, Jr.	C.E., '41	Netcong, N.J.
Galloway, James Wesley, Jr.	C.E., '44	Miami Beach, Fla.
Galton, William Charles	Chem., '44	Madison, N.J.

Gamble, Ernest, Jr.	Ch.E., '42	Langhorne
Gams, Theodore Charles	E.E., '43	Newark, N.J.
Gantner, John	Bus., '41	Nutley, N.J.
Gardner, Henry Augustus	Bus., '44	Lakewood, N.Y.
Garling, Richard Angle	Chem., '41	Shippensburg
Garvin, Henry Watterson, Jr.	M.E., '43	Gettysburg
Gaughran, George Richard Lawrence	Arts, '42	Allentown
Gawthrop, George, Jr.	Ch.E., '44	Philadelphia
Gearhart, David Franklin	Arts, '44	Palmerton
Gebert, Russel Charles, Jr.	I.E., '42	Elkins Park
Gehr, John Edwin	Bus., '44	Binghamton, N.Y.
Geiger, Michael Louis	Bus., '43	Bethlehem
Geissinger, David Stichter	C.E., '41	Macungie
Gengenbach, Robert Edwin	M.E., '42	Bristol, Conn.
Georgopulo, Panos Basil	Bus., '43	New York, N.Y.
Gerhart, Richard Lee	C.E., '44	Ephrata
Gerson, Saul	Arts, '44	Great Neck, N.Y.
Gheen, William Evans	M.E., '42	Jersey Shore
Giddings, Randall Clinton	Arts, '43	Uniondale
Gilchrist, Claude Denis	I.E., '41	Maplewood, N.J.
Giles, Charles Kenneth	Ch.E., '44	Lowell, Mass.
Gill, Robert Joseph	Chem., '44	Philadelphia
Gilmore, Edward Michael, Jr.	Chem., '41	Altoona
Gilmore, Frederick Richard	Arts, '41	Bloomsburg
Gilmore, Irvin Willets	Arts, '44	Hughesville
Gilmore, Robert Dale	Arts, '44	Harrisburg
Gilmore, Wheeler, Jr.	M.E., '43	Secane
Ginter, Charles Albert, Jr.	Chem., '43	Winonah, N.J.
Gitzendanner, Louis George	E.E., '41	New York, N.Y.
Gleadall, Walter William, Jr.	Arts, '42	Jackson Heights, N.Y.
Glessner, William Pius	Met.E., '44	Bethlehem
Godlove, Arnold Lettelle	C.E., '41	Hagerstown, Md.
Godycki, Ludwig Edward, Jr.	Ch.E., '43	Hellertown
Goebel, Richard Farrand	Bus., '43	Scarsdale, N.Y.
Goetz, George Zieber, Jr.	Bus., '42	Reading
Gold, Gilbert Samuel	Arts, '43	Trenton, N.J.
Gold, William Oliver	Arts, '44	Bethlehem
Golden, Thomas Herman, III	Bus., '43	Pottsville
Goldstein, Sanford David	Bus., '42	Allentown
Good, William Eckert	M.E., '41	Riverton, N.J.
Goodman, Gordon Bennett	Bus., '43	Bethlehem
Goodman, Robert Edward	Arts, '42	New Rochelle, N.Y.
Gordon, James Allison	Bus., '42	Short Hills, N.J.
Gordon, Kilbourn, Jr.	Bus., '42	Bronxville, N.Y.
Gordon, Richard Cameron, Jr.	Bus., '42	New York, N.Y.
Gordon, William Davis, Jr.	Bus., '43	Philadelphia
Gore, James, III	Ch.E., '42	Coraopolis
Gorman, William Dean	Arts, '43	Swarthmore
Gosztanyi, Rudolph Edward, Jr.	Arts, '42	Bethlehem
Goth, Joseph Herman, Jr.	Arts, '44	Bethlehem
Gottschall, Richard Carl	E.E., '44	Scranton
Gould, Gregory	I.E., '42	North Tarrytown, N.Y.
Gould, Joseph Albert	Arts, '42	Watertown, N.Y.
Gover, James Frederick	Met.E., '43	Wilkes-Barre
Graham, Walter Owen	M.E., '42	Upper Montclair, N.J.
Grandage, Arnold Herbert Edward	Arts, '42	Montclair, N.J.

STUDENTS

Grasso, Vincent Frank	Bus., '44	Kingston
Gray, John Raymond	C.E., '43	New York, N.Y.
Gray, Richardson	M.E., '41	Pittsburgh
Green, David Wagener	E.E., '44	Easton
Green, John Thomas	Bus., '42	Allentown
Green, Robert Lee	M.E., '43	Titusville
Greene, Clifford Nathan	M.E., '44	Plainfield, N.J.
Greene, Leonard Robert	Phys., '43	Brooklyn, N.Y.
Greener, Carl Lehnert	Arts, '43	Allentown
Gregory, David Evans	Bus., '43	Norwalk, Conn.
Greiner, John Richard	M.E., '43	Bethlehem
Gress, Frank Joseph	Arts, '41	Bethlehem
Gressitt, John	Arts., '43	Evanston, Ill.
Gretz, John Louis	Met.E., '44	Wayne
Griesemer, Henry Jacob	M.E., '41	Schnecksville
Griffith, George Leslie, Jr.	E.M., '41	Cranford, N.J.
Griffith, Harvey Conrad, Jr.	E.E., '41	Wayne
Groeger, William Vincent	Bus., '41	Bethlehem
Gross, Edward Kennard	M.E., '44	Montclair, N.J.
Gross, John Hammes	Met.E., '44	Bethlehem
Gross, Joseph Eugene	Ch.E., '43	Philadelphia
Grossman, Stanley	Arts, '41	Providence, R.I.
Grubb, Harold Alexander	Met.E., '42	North Hills
Gruber, William Dietrich	Bus., '41	Bethlehem
Gruenwald, Fred Solomon	Chem., '44	New York, N.Y.
Gsell, Ernest John	Arts, '44	East Orange, N.J.
Guckes, Philip Scott	Bus., '43	Elkins Park
Guidon, Michael, III	M.E., '42	Freemansburg
Gunnison, Rolla Harry	Arts, '41	Girard
Gurak, Michael	Ch.E., '44	Scranton
Gusdorff, Robert Neuman	Bus., '42	Hasbrouck Heights, N.J.
Haas, Robert Charles	Ch.E., '43	Irvington, N.J.
Hacket, Charles Ralph	Ch.E., '44	Allentown
Hackman, Norman	Bus., '42	New Rochelle, N.Y.
Hackney, Clarence Winton, Jr.	M.E., '41	Pleasantville., N.J.
Haft, Alfred Lewis	Bus., '43	New York, N.Y.
Hageny, John Howard, Jr.	Arts, '41	Jersey City, N.J.
Hagey, Charles Donald	Arts, '44	Bethlehem
Haines, Harold Woodbury	Ch.E., '42	Short Hills, N.J.
Haire, Douglas Mathison	Bus., '42	Maplewood, N.J.
Halbedl, Donald	Bus., '42	New York, N.Y.
Hall, Edgar James	E.M., '44	Ridgewood, N.J.
Hall, William Mitchell	Bus., '44	Red Bank, N.J.
Halligan, Robert Rawson	E.E., '41	West Orange, N.J.
Hamblin, John Frederic, Jr.	Arts, '41	Newark, N.J.
Hamilton, James Gray	E.M., '42	Duluth, Minn.
Hammer, Robert Mohr	Bus., '43	Allentown
Hammond, Robert Arrison	Ch.E., '42	Allentown
Hammond, Stuart Lindsley	Bus., '44	Maplewood, N.J.
Haney, Ralph Leighton, Jr.	E.E., '42	Norristown
Hanger, Ryland Truscott	E.E., '44	Haddonfield, N.J.
Hanks, Fletcher, Jr.	Bus., '41	Oxford, Md.
Hanson, George Warren	Bus., '42	Scarsdale, N.Y.
Hanudel, Edward Alfred	Ch.E., '42	Roselle, N.J.
Hardenbergh, Richard Charles	Bus., '43	Newburgh, N.Y.
Hardy, Richard	M.E., '44	Bethlehem

Harnisch, Robert Edwin	Ch.E., '43	Maplewood, N.J.
Harper, Milton Willin	Ch.E., '42	Seaford, Del.
Harris, Dale Ackley	Arts, '42	Trenton, N.J.
Hart, Stephen	Arts, '43	Pelham Manor, N.Y.
Hartdegen, Carl, III	E.M., '41	Maplewood, N.J.
Hartman, George Solomon	Ch.E., '43	Bethlehem
Hartnett, William Francis	Bus., '41	Akron, O.
Hartung, Albert Edward	Arts, '44	Freeland
Haslet, Richard Milton	E.E., '43	Easton
Hauserman, William Foley	I.E., '41	Cleveland Heights, O.
Haven, Gilbert Pond	Bus., '43	Cleveland Heights, O.
Hawkins, Donald Judson	M.E., '44	Palmerton
Hayes, William Daniel	I.E., '43	Windber
Hazard, Richard Parse	Arts, '42	Morrisville
Hebrank, William Howard	M.E., '44	Baltimore, Md.
Heck, George Walley, Jr.	Met.E., '44	Bethlehem
Heck, Theodore Guy	Arts, '44	Bethlehem
Heerdt, Bruce White	Bus., '44	New Canaan, Conn.
Heimer, Burt Lewis	Bus., '43	Binghamton, N.Y.
Heins, Edward Daniel	M.E., '41	Philadelphia
Heinz, Barton Royal	Bus., '43	Westfield, N.J.
Heironimus, Robert Allen	M.E., '44	Maplewood, N.J.
Heley, Walton Francis, Jr.	Arts, '43	West Hartford, Conn.
Heller, Joseph Hummel, Jr.	Bus., '42	Bethlehem
Helm, Donald Raub	I.E., '44	Lancaster
Hemphill, Albert Weimer, Jr.	M.E., '43	Upper Montclair, N.J.
Hendershot, Jerry Nugent	Arts, '44	Newton, N.J.
Hendrian, William Eberly	C.E., '44	Mechanicsburg
Hendrick, Richard Baldwin	Met.E., '44	East Orange, N.J.
Hendry, James Ralston	Bus., '41	East Orange, N.J.
Henry, John Howard	I.E., '44	East Orange, N.J.
Henry, Wilbur Edwin, Jr.	Arts, '44	Glen Cove, N.Y.
Hensinger, Claude Elias	M.E., '41	Allentown
Herbert, Edgar, Jr.	C.E., '41	Orefield
Herold, Harry Albert, Jr.	I.E., '43	Bristol, Conn.
Hertzog, Frank VerNooy	Arts, '41	Bethlehem
Herzer, Charles John, Jr.	Arts, '44	Allentown
Hess, Albert Wesley	Met.E., '41	Scranton
Hess, Edgar William	Chem., '44	Catasauqua
Hess, Frederick George	E.M., '44	Catasauqua
Heumann, Chapin	Met.E., '43	Sewickley
Hewitt, George Frank	M.E., '44	Harrisburg
Heyniger, Richard Lambert	Bus., '42	Waterbury, Conn.
Hicks, Robert Holliday, Jr.	I.E., '44	Baltimore, Md.
Hill, John Balmain, Jr.	M.E., '42	Hamburg, N.Y.
Hill, Lewis Warner	M.E., '44	Bethlehem
Hillegass, David Nelson	Bus., '44	Quakertown
Hillenbrand, Louis Joseph, Jr.	Ch.E., '42	Allentown
Hilton, Charles Carlson	Met.E., '44	Hamilton, Ontario, Can.
Himmelberger, Franklin	Arts, '43	Coopersburg
Himmelwright, Warren Alfred	Ch.E., '42	Bethlehem
Hine, Edwin Warren, II	E.E., '41	Short Hills, N.J.
Hinman, William Bushnell	Bus., '43	East Orange, N.J.
Hinrichs, Alan Dabney	M.E., '43	New Rochelle, N.Y.
Hinterleiter, Raymond William	Ch.E., '43	Allentown
Hird, Arthur Douglas	I.E., '44	Englewood, N.J.

STUDENTS

Hird, Ralph Craven	Ch.E., '42	Englewood, N.J.
Hitchcock, William Paige	Arts, '42	Syracuse, N.Y.
Hittinger, William Charles	Ch.E., '44	Bethlehem
Hoch, Howard Addison, Jr.	Bus., '42	Bethlehem
Hoch, James Jonathan	Arts, '42	Bethlehem
Hodson, William Kenneth	I.E., '41	Flushing, N.Y.
Hoerner, Walter Russel	Bus., '43	Hummelstown
Hoffacker, Benjamin Franklin, Jr.	Bus., '44	Pittsburgh
Hoffman, Chester Adam	Ch.E., '42	Allentown
Hoffman, Clair Adam	Ch.E., '44	Palmerton
Hoffman, Duyane Allan	Bus., '43	Plainfield, N.J.
Hoffman, Warren Edward	E.E., '43	Union, N.J.
Hoffner, Bernard Earl	Ch.E., '42	Bethlehem
Hofstetter, Robert August	Bus., '41	Westfield, N.J.
Hogan, John Vincent	Arts, '44	Forest Hills, L.I., N.Y.
Hohman, Ralph Everett	M.E., '44	Orange, N.J.
Holberton, Thomas Seir Cummings, Jr.	Chem., '42	Hackensack, N.J.
Holberton, William Bane	Bus., '43	Hackensack, N.J.
Holby, George Vernon	Ch.E., '42	Riverside, Conn.
Holderer, George Morris	Bus., '44	Scarsdale, N.Y.
Holland, Robert Harry	E.M., '43	Bethlehem
Hollander, Seymour Lawrence	Ch.E., '42	Maplewood, N.J.
Hollenbach, Harvey Granville, Jr.	I.E., '44	Harrisburg
Holmes, Walter Stephen, Jr.	Bus., '41	Philadelphia
Holtvedt, John Rolf	Bus., '43	Great Neck, N.Y.
Holyoke, Caleb William	M.E., '42	Milwaukee, Wis.
Hood, John Merrill	I.E., '41	Arlington, Va.
Hopkins, Richard Charles	M.E., '43	Narberth
Horka, Alfred Edward	Ch.E., '42	Passaic, N.J.
Horn, Fenwick Peck	M.E., '43	Lansdowne
Horn, Henry Joseph	E.E., '41	Ashland
Horn, John Leonard	Arts, '43	South Orange, N.J.
Hornbrook, Philip Roberts, Jr.	Bus., '42	Allentown
Hosford, James Allison	M.E., '44	Maplewood, N.J.
Houck, George, Jr.	Arts, '41	Scranton
Housel, Frederick Henry	E.E., '41	Audubon, N.J.
Houseman, John	C.E., '43	Allentown
Houston, George William	Ch.E., '43	Port Washington, N.Y.
Houston, William Osborne	I.E., '44	Old Greenwich, Conn.
Howard, William Edward, III	Bus., '42	Montreal, Canada
Howe, Donald Clinton	E.M., '42	Allentown
Howland, George William, Jr.	C.E., '41	Sea Bright, N.J.
Hubeny, Jerry Charles	I.E., '42	Elizabeth, N.J.
Huber, Herman Arnold	Arts, '44	Narrowsburg, N.Y.
Hucker, John Joseph	Ch.E., '43	Norristown
Hume, David Lindsay	I.E., '42	Tulsa, Okla.
Humm, Douglas Hammond	Bus., '43	Flushing, N.Y.
Humphrey, Thomas Frederick	M.E., '44	Woodbridge, N.J.
Hunold, Frank Addison	M.E., '43	Port Washington, N.Y.
Hunsberger, Isaac Moyer	Ch.E., '43	Quakertown
Hunt, John Ashberry	Arts, '42	Great Neck, N.Y.
Hunt, Thomas Reed	Bus., '42	Bethlehem
Hunt, Thomas Reed	Arts, '41	Wilmington, Del.
Huntoon, Raymond Chester	Bus., '41	Scranton
Hursh, William Boyd	Met.E., '44	Bethlehem

Hutchinson, Edwin Joseph	Bus., '42	Allentown
Hyun, Jason	M.E., '42	Delano, Cal.
Inderrieden, Alfred John	Ch.E., '44	Tulsa, Okla.
Ingemanson, Carl Richard	E.E., '44	Succasunna, N.J.
Iobst, Robert Marvin	Bus., '43	Bethlehem
Irvin, William Edward, Jr.	M.E., '43	Gary, Ind.
Ives, Alver Homer, Jr.	M.E., '41	New York, N.Y.
Ivey, Floyd Emerson	Ch.E., '42	Bethlehem
Jackson, Robert Clinton	M.E., '43	Pen Argyl
Jacobsen, Jacob Thorsten	Ch.E., '43	Camden, N.J.
Jacoby, Joseph Harry	Bus., '41	Harrisburg
Jahn, Gregory Albert	Arts, '43	Clifton, N.J.
Jardine, William Donald	Ch.E., '43	Buffalo, N.Y.
Jaslow, Robert Irwin	Arts, '44	Reading
Jefferson, James Stafford	Bus., '44	Larchmont, N.Y.
Jenkin, Austen Erwin	Bus., '42	Bellerose, L.I., N.Y.
Jensen, Robert Otto	Arts, '43	Freeport, N.Y.
Jensen, Robert William	M.E., '44	Springdale, Conn.
Jerauld, Covel Thurber	M.E., '41	Rumford, R.I.
Johansen, Alfred Pitt	I.E., '44	Hasbrouck Heights, N.J.
Johler, Robert Andrew	M.E., '41	Scranton
Johnson, Charles Armond	Bus., '43	Maplewood, N.J.
Johnson, Charles Henry	C.E., '41	Honesdale
Johnson, Howard Alexander	Met.E., '43	Niagara Falls, N.Y.
Johnson, Malcolm Stanley	I.E., '44	Luzerne
Johnson, Ralph Richard	Arts, '44	Easton
Johnson, Richard Barney	Arts, '41	Philadelphia
Johnston, Ralph Barkley	Ch.E., '41	Wilmington, Del.
Jones, Alan Francis	Ch.E., '44	Philadelphia
Jones, Evan	Met.E., '44	Clairton
Jones, Harry Furlong	Bus., '41	Scranton
Jones, Harry Witmer, Jr.	I.E., '42	Harrisburg
Jones, Jackson Tipton	Arts, '43	Sweetwater, Tenn.
Joraleman, John Ladell Seward, Jr.	I.E., '44	South Orange, N.J.
Jordan, Russell Cornelius	I.E., '44	Hasbrouck Heights, N.J.
Joslin, Robert Edward	Bus., '43	Greenville, Del.
Kalinowski, Henry Thomas	Bus., '42	Scranton
Kalmbach, Charles Frederic	M.E., '41	Lansdowne
Kampfe, William Richard	Bus., '42	Morristown, N.J.
Kantrowitz, Marvin Daniel	Bus., '41	New York, N.Y.
Kaplon, Morton Fischel	Phys., '41	Brunswick, Md.
Karas, John Athan	Phys., '44	Lebanon
Karpowich, Daniel	C.E., '44	Allentown
Karwacki, Anthony Michael	E.M., '41	Chester
Kaszycki, Joseph	E.E., '41	Pe Ell, Wash.
Kaufmann, John Augustus	Arts, '41	Wyomissing
Keating, Joseph Francis	Bus., '41	Bethlehem
Keenan, Robert Edward	Bus., '44	Allentown
Keiser, William Edwin	Chem., '41	Lyon Station
Kelechava, Theodore	I.E., '43	Allentown
Kellar, Richard John	M.E., '44	Allentown
Keller, George Freeman	Arts, '44	Elizabeth, N.J.
Kellett, John, III	Ch.E., '42	Springfield
Kelly, John Edwin	M.E., '44	Rio Grande, N.J.
Kemmer, Joseph Francis	Ch.E., '43	Larchmont, N.Y.
Kendall, Aldrich Frederick	Arts, '41	Millburn, N.J.

STUDENTS

Kendall, Wallace Crane	Met.E., '41	Summit, N.J.
Kendziora, Carl August, Jr.	Arts, '44	Harrison, N.Y.
Kennedy, John Marius	I.E., '44	New York, N.Y.
Kerchmar, Rudolph	E.E., '43	Bethlehem
Kern, Franklin Brooks	I.E., '44	Cleveland Heights, O.
Kervick, Paul J.	I.E., '44	Springfield, Mass.
Kidder, James Henry	Arts, '42	Germantown
Kiefer, Charles Raymond, Jr.	Arts, '41	Easton
Kimberley, John Arthur	M.E., '42	Dalton, Mass.
King, Harold	Arts, '41	Morristown, N.J.
King, LeRoy Ordway, Jr.	Bus., '43	Washington, D.C.
Kingman, Alton Hayward, Jr.	I.E., '44	West Orange, N.J.
Kingsbury, Chester Lyman, Jr.	Bus., '44	Middletown, O.
Kirk, Richard Leslie	Ch.E., '41	Harrisburg
Kirschner, William Caspar	Chem., '43	Flushing, N.Y.
Kister, Edward Arthur	C.E., '41	Brooklyn, N.Y.
Kister, George Frederick, Jr.	Arts, '44	Brooklyn, N.Y.
Kistler, David Lyle	Met.E., '43	Hamburg
Kizer, John Floyd, Jr.	Arts, '43	Towanda
Klein, Edwin Howard	Arts, '42	Paulsboro, N.J.
Klein, Louis Edward	Ch.E., '42	Easton
Kleinknecht, Robert Charles	Ch.E., '44	Grantwood, N.J.
Kleppinger, Carl Theodore	Chem., '44	Allentown
Kleppinger, Donald Henry	Met.E., '42	Bethlehem
Kline, Donald John	Arts, '41	Cementon
Kline, Eugene Leonard	Arts, '42	Trenton, N.J.
Klopp, Frederick Schlosman	Ch.E., '41	Shillington
Kluger, Conrad Erwin	Arts, '42	Paterson, N.J.
Knight, William Charles	Ch.E., '44	Westfield, N.J.
Knoll, Kenneth Robert	Bus., '44	Crestwood, N.Y.
Kochuba, Thomas Joseph	Chem., '41	Wilkes-Barre
Kocyan, George Henry, Jr.	M.E., '44	Kingston
Koller, Arnold Jerome	Bus., '41	Bethlehem
Konolige, Carl George	Arts, '42	Bethlehem
Kopyta, Francis Winton	M.E., '42	Somerville, N.J.
Koromitz, Peter	E.E., '43	Allentown
Kott, Seymour Howard	Bus., '41	New York, N.Y.
Kotulak, Francis Andrew	M.E., '41	Nanticoke
Kowalshyn, Stephen, Jr.	E.E., '41	Northampton
Kramer, Frederick Franklin, III.	Bus., '41	Allentown
Kramer, Robert Clayton	Ch.E., '43	Duryea
Kratzer, John Lewis Edward	E.E., '44	East Fogelsville
Kraus, Edward William	M.E., '42	Maplewood, N.J.
Krawchuk, John Alfred	E.E., '43	Bridgeport
Krebs, Donald Eugene	Ch.E., '43	Marietta
Krevsky, Seymour	Arts, '42	Allentown
Krissiep, Max, Jr.	Phys., '42	Wyomissing
Krone, Frederick Albert	Ch.E., '42	Freeland
Kronthal, William Louis	C.E., '44	New York, N.Y.
Krumscheid, Robert Warren	Bus., '44	Paterson, N.J.
Kucey, Stephen John	Bus., '42	Bethlehem
Kucher, Charles Gierman	Ch.E., '43	Irvington, N.J.
Kuczynski, John Joseph	Bus., '41	Albany, N.Y.
Kuhar, William Anthony	E.E., '43	Bethlehem
Kuklentz, Richard Charles	Arts, '41	Bethlehem
Kulp, Richard Lincoln	Ch.E., '42	Bethlehem

Kurtz, Claude Jennings	Ch.E., '44	Berwick
Kurtz, Donald Wayne	E.E., '42	Phoenixville
Kurtz, Joseph James	Ch.E., '43	Northampton
Kutosh, Stephen	Ch.E., '44	Bethlehem
Lampert, John Carl	Ch.E., '42	Carlstadt, N.J.
Landesman, Arthur Lewis	Ch.E., '43	Morris Plains, N.J.
Landis, John Prince	M.E., '43	Old Greenwich, Conn.
Lane, Jack Emmett	I.E., '43	Mount Lebanon
Lapovsky, Alfred Baer	Phys., '43	Brownsville
Larkin, Joseph Peter, III	Bus., '42	Jersey City, N.J.
Larson, Leonard Dale	M.E., '43	Shaker Heights, O.
Lasser, Arnold	Bus., '44	New Rochelle, N.Y.
Latimer, Elwood D., Jr.	Ch.E., '42	Scranton
Lau, Ralph Rupp	E.E., '44	Harrisburg
Laube, Theodore Charles	Ch.E., '44	East Orange, N.J.
Lawshe, Bernard Volger	M.E., '44	Waterbury, Conn.
Lawson, Thomas Allan	Ch.E., '44	New York, N.Y.
Layton, Donald William	Ch.E., '42	Brooklyn, N.Y.
Leach, George Harold	Arts, '43	Roselle, N.J.
Leaf, Charles Clay	E.E., '44	South Orange, N.J.
Leaman, Claude Frank, Jr.	Arts, '43	Westfield, N.J.
Leavens, Robert Willis	Bus., '41	Rochester, N.Y.
Leaver, Ross Wilburton	Ch.E., '42	Chester, N.J.
LeBlanc, Benjamin Clark, Jr.	Arts, '43	Troy, N.Y.
Leckie, Andrew Fredrick, Jr.	Bus., '43	Columbus, O.
Lee, Albert Everett, Jr.	Ch.E., '41	Moorestown, N.J.
Leeds, Richard Henry	Bus., '44	Larchmont, N.Y.
Leet, Edwin Leslie	C.E., '44	Westfield, N.J.
Lehman, Jack Kiehl	Bus., '43	Port Huron, Mich.
Lehr, Charles Ellis, Jr.	Bus., '44	Bethlehem
Lehr, William Haller	M.E., '41	Elkins Park
Lehrer, Arthur Morton	Bus., '43	Brooklyn, N.Y.
Leichliter, Otto Gay	Met.E., '42	Pittsburgh
Leidig, Leonard Jack	Bus., '44	York
Leifheit, Howard Clifford	Arts, '43	Queens Village, N.Y.
Leighton, John Donald	Bus., '42	Port Huron, Mich.
Leitner, Frank Nicholas	Bus., '44	Maplewood, N.J.
Lempert, Leonard Harvey	Bus., '44	Montclair, N.J.
Leroux, André Jean Emile	Arts, '44	Philadelphia
Le Roy, Gaynor Otto Henry	Bus., '44	Newburgh, N.Y.
Le Roy, George H. M.	Bus., '41	Newburgh, N.Y.
Lesh, Nathan George	E.E., '43	Wind Gap
Levi, James Sigmund	Bus., '44	New Rochelle, N.Y.
Levin, Gustav Marten	Bus., '43	Bethlehem
Levy, Monroe	Arts, '42	Trenton, N.J.
Lewis, Thomas Jenkins, Jr.	Bus., '41	McKeesport
Librizzi, Frank Paul	E.E., '42	Newark, N.J.
Lichtenstein, Valentine, Jr.	M.E., '41	Jersey City, N.J.
Liebau, Charles Lowell, Jr.	Bus., '43	Nutley, N.J.
Lindsay, William Henry, Jr.	C.E., '42	Haddonfield, N.J.
Linge, William Christ	I.E., '42	Bethlehem
Link, Roderick Wylie	E.E., '44	Glen Rock, N.J.
Linker, F. Robert	Arts, '44	Brooklyn, N.Y.
Litzenberger, Willard Andrew	Arts, '41	Bethlehem
Llewellyn, Harold Zelophehad	M.E., '41	Summit Hill
Logan, George Alexander	Arts, '42	Maplewood, N.J.

STUDENTS

Logan, Robert Westfall	Ch.E., '44	Coatesville
Logechnik, Basil William	I.E., '42	Bethlehem
Loh, Raymond William	Bus., '44	Teaneck, N.J.
Lomar, Alfred Arthur	Ch.E., '44	Ridgewood, N.J.
Long, Robert Martin	Met.E., '44	Bethlehem
Long, Walter Raymond, Jr.	Bus., Spl.	Wilkes-Barre
Longley, Dwight Francis	Bus., '44	Maplewood, N.J.
Longley, Stephen Brooks	Arts, '42	Maplewood, N.J.
Loomis, Emery Wight, Jr.	Bus., '41	Lansdowne
Loose, John Freeman	I.E., '41	West Orange, N.J.
Loose, Robert Jacob	I.E., '41	West Orange, N.J.
Lorimer, Donald McFaul	E.M., '44	Douglaston, N.Y.
Loucks, Jess Brodbeck	Ch.E., '42	York
Loucks, Thomas J.	E.E., '44	Maplewood, N.J.
Louden, Clarence Earl, Jr.	Arts, '42	Kittanning
Louden, Henry Cameron	Bus., '42	Nutley, N.J.
Loughran, John Louis	Bus., '42	Philadelphia
Loveless, Charles Tweed-dale	I.E., '42	West Farmington, O.
Lowe, George Elmer, Jr.	Chem., '41	Kingston, N.Y.
Lowry, Donald Randolph, Jr.	M.E., '44	Flushing, N. Y.
Lowry, Stephen Tener	C.E., '41	East Cleveland, O.
Lucarelle, Nicholas Joseph	Bus., '43	Bridgeport, Conn.
Lucker, James Frederick	M.E., '44	Lansdowne
Luckring, Richard Michael, B.S. (Heidelberg College)	Ch.E., '42	Canton, O.
Lueddeke, Gustave Fredrich, Jr.	Ch.E., '43	Maplewood, N.J.
Luley, Howard George	C.E., '42	New Kensington
Luse, Andrew Philetus	Bus., '41	Newton, N.J.
Lutters, Philip	M.E., '42	Shelton, Conn.
Lutz, George Arthur	Bus., '43	Mahanoy City
Lutz, George Rufus, Jr.	M.E., '41	Reading
Lutz, William Harry	M.E., '44	Mahanoy City
Lynch, Robert Merrill	Arts, '42	Greenwich, Conn.
Lynn, Harry Wasdell, Jr.	Bus., '44	Floral Park, L.I., N.Y.
Lyons, Robert James	Ch.E., '43	Steubenville, O.
Lytle, Creighton Lamar	Chem., '44	Minersville
Maack, Herman Ralph	Ch.E., '44	Pottstown
MacAllister, Thomas Crawford, Jr.	E.E., '43	Milford, Conn.
MacDonald, John Stanley	E.E., '42	Haddonfield, N.J.
Mackey, Walter Augustus	E.M., '44	Millburn, N.J.
MacMinn, John Linnaeus	M.E., '44	WilliamSPORT
MacNamee, Stanley Gulick	Bus., '41	Princeton, N.J.
Maco, Stephen Gabriel	Met.E., '41	Bethlehem
Macy, Robert Russell	Ch.E., '42	Kensington, Md.
Mahoney, Harold Edward	Bus., '42	Pawtucket, R.I.
Maiden, Robert Mercier	Phys., '42	Trenton, N.J.
Mainwaring, William Thomas	Met.E., '42	Pittsburgh
Malley, John Edward	M.E., '43	Minersville
Malley, Wallace Ward, Jr.	Bus., '43	Hamden, Conn.
Malloy, Edwin Sitgreaves	M.E., '41	Phillipsburg, N.J.
Maloney, John Joseph, Jr.	E.M., '43	Forty Fort
Manion, Keron Martin	Ch.E., '41	Clifton, N.J.
Mann, Arthur Forrest	Arts, '43	Bethlehem
Mantis, Theodore Miller	I.E., '41	Reading
March, Brookman Jack	Ch.E., '41	Shillington
Marcks, Donald Alton	Bus., '43	Nazareth

Margiotti, Vincent John Francis	Ch.E., '44	Newburgh, N.Y.
Margolies, Roydon Seymour	Arts., '43	Long Beach, N.Y.
Margolis, Seymour	Bus., '41	New York, N.Y.
Marini, John William	Arts., '44	Passaic, N.J.
Mark, Sander	C.E., '42	New York, N.Y.
Markel, Edwin Moser	Bus., '41	Conshohocken
Marsh, James Sutherland	I.E., '44	Washington, D.C.
Marshall, Paul William	I.E., '42	Pottstown
Marshall, Robert Henry	I.E., '42	Kennett Square
Marsten, Richard Oliver	E.M., '41	Bethlehem
Martin, Donald Sherwood	Bus., '42	Narberth
Martin, John Withrow	M.E., '44	Sadsburyville
Marusi, Gene	Met.E., '43	New York, N.Y.
Marvin, James Arthur, Jr.	Met.E., '41	Scarsdale, N.Y.
Mascelli, Ferdinand	E.E., '44	Carbondale
Mascuch, Richard	I.E., '42	South Orange, N.J.
Masem, Harold Joseph	Arts., '41	Brooklyn, N.Y.
Mason, Richard Withington	Phys., '43	Foxboro, Mass.
Mathes, Robert Harris	E.E., '44	Millburn, N.J.
Matheson, William Angus, Jr.	Bus., '42	New York, N.Y.
Mathewson, John Hards	Ch.E., '41	Elkins Park
Matthews, Roy Earl	Phys., '43	Washington, N.J.
Matzko, John Joseph	Arts., '42	St. Clair
Mayer, Franklin Bliss	Arts., '42	Erie
Mayo, Sterling Elliott	E.E., '44	Metuchen, N.J.
McAfee, Daniel Bosworth	Bus., '42	Rye, N.Y.
McCandless, Gerald Joseph	M.E., '44	Bethlehem
McCarthy, James John	Bus., '44	Bethlehem
McClave, Wilkes, II	Bus., '42	Maplewood, N.J.
McClay, John Donald	Bus., '42	Tenafly, N.J.
McClenachan, William Blake, III	Arts., '43	Trainer
McConnel, William Bruce, Jr.	Bus., '41	Mount Lebanon
McConnell, Malcolm Findley, Jr.	M.E., '42	Pittsburgh
McConnor, William Sandborn	I.E., '44	Pittsburgh
McDonnell, Hubert, Jr.	I.E., '44	Greenwich, Conn.
McElroy, William Pershing	Bus., '41	Bridgehampton, L.I., N.Y.
McGeady, Leon Joseph	Met.E., '43	Freemansburg
McGee, John Joseph	C.E., '43	Allentown
McGee, William	Ch.E., '43	Allentown
McGinnis, James Gates	C.E., '41	Bridgeton, N.J.
McGonigle, John Leo, Jr.	C.E., '42	Allentown
McGrath, Charles Edward	Bus., '43	Scranton
McGrath, Frank Joseph	Ch.E., '44	Yonkers, N.Y.
McGregor, Robert John	Ch.E., '42	Dunmore
McGuiness, Francis Joseph Stephens	M.E., '43	Swarthmore
McInerney, Robert Michael	Ch.E., '44	Allentown
McIntosh, William Austin	M.E., '44	New York, N.Y.
McJames, William Charles	Ch.E., '42	South Orange, N.J.
McKaig, Chandler Hayes	Ch.E., '43	Wilmington, Del.
McKay, Freeman Parke, Jr.	Phys., '43	Somerville, N.J.
McKenna, Frank Shirley	Met.E., '42	Crafton
McKinley, George Thomas	Arts., '44	Palmerton
McKinley, Leonard John	Ch.E., '41	Mount Vernon, N.Y.
McKnight, George William	M.E., '44	Freemansburg
McMichael, Robert Charles	Met.E., '42	Chester
McNamara, Roger James	I.E., '41	Bethlehem

STUDENTS

Meacham, John Warren	E.E., '44	Trucksville
Meckbach, Raymond Theodore	Bus., '42	Bogota, N.J.
Meehan, John Joseph	Arts, '43	Freeland
Megas, Theodore George	Ch.E., '44	Mauch Chunk
Mehrkam, Quentin Dewey	Met.E., '43	Allentown
Meighan, James Charles, Jr.	M.E., '44	Northampton
Meigs, William Ross	Arts, '44	Manopla, Cuba
Meikle, William Jackson	Arts, '41	Harrisburg
Mekeel, Tom Charles	Arts, '42	Easton
Melick, Arthur Runyon	I.E., '41	Allentown
Melloy, George Florian	Arts, '44	Bethlehem
Mengel, John Franklin	M.E., '44	Bethlehem
Mercer, Jack Roos	M.E., '43	Lynbrook, N.Y.
Mermann, Alan Cameron	Arts, '44	Baldwin, L.I., N.Y.
Mesirow, Nicholas James	Arts, '42	Philadelphia
Messinger, Claude Orison	I.E., '43	Bethlehem
Messinger, George Franklin	M.E., '41	Tatamy
Metius, Richard Edward	Met.E., '42	Narberth
Metten, William Fowler, Jr.	Bus., '44	Wilmington, Del.
Mettler, John Daniel, Jr.	Ch.E., '41	Crowl
Metzger, Richard Edward	Ch.E., '42	Turtle Creek
Metzner, Robert	Bus., '42	Albany, N.Y.
Meury, Robert Edward	Bus., '44	Rutherford, N.J.
Meyer, Charles Franklin	Bus., '43	Doylestown
Middleton, Donald Mayo	Bus., '43	Pittsburgh
Milbank, John Henry	Bus., '42	Bloomfield, N.J.
Miller, Albert Marshall	Met.E., '42	St. Petersburg, Fla.
Miller, Edgar Hanmer	Bus., '44	East Orange, N.J.
Miller, George Frederick	Chem., '44	West Reading
Miller, Jack Leslie	Arts, '44	Clifton, N.J.
Miller, Leonard Hanmer	I.E., '42	East Orange, N.J.
Miller, Martin Elmer, Jr.	M.E., '44	Harrisburg
Miller, Philip Horace	Bus., '43	Rahway, N.J.
Miller, Raymond Chester	Bus., '41	New York, N.Y.
Miller, Richard Earle	Arts, '42	Northampton
Miller, Robert Bruce	M.E., '42	Bethlehem
Miller, Robert Donald	Ch.E., '41	Upper Darby
Miller, Walter Ernest	Chem., '44	Elizabeth, N.J.
Miller, Warren Hasbrouck	Bus., '41	Bogota, N.J.
Mills, Courter Dickinson	Arts, '44	Clairton
Miltenberger, Robert Stanley	Met.E., '44	Easton
Mincemoyer, Robert Francis	Arts, '41	South Williamsport
Minde, George Frank	Arts, '42	Summit, N.J.
Mink, Samuel Russell, Jr.	Arts, '44	Bristol, Conn.
Miraglia, John Francis	Arts, '42	Port Chester, N.Y.
Miskinis, Kay Felix	E.E., '43	Bethlehem
Mitchell, Andrew	Ch.E., '44	Philadelphia
Mitchell, Jackson Froelicher	I.E., '43	Larchmont, N.Y.
Mitchell, James	Met.E., '41	Arlington, Va.
Mohap, Frank Joseph	Bus., '43	Bethlehem
Mohr, Luther Albert	Met.E., '41	Reading
Moll, Harvey Donald	M.E., '43	Lansdale
Montbach, Robert Eugene	Met.E., '41	Hellertown
Moodie, Stanley Thompson	Bus., '44	Grove City
Moog, Arthur Edward	I.E., '41	Summit, N.J.
Moore, Charles Frederick	Arts, '44	Claymont, Del.

Moore, Robert Condit	C.E., '43	Maplewood, N.J.
Morehouse, Donald Quimby	Met.E., '43	Watertown, N.Y.
Moreton, Neal Sam	I.E., '44	Erie
Morgal, Franklin Lecron	Bus., '43	Harrisburg
Morgan, Warren King, Jr.	E.E., '43	Morris Plains, N.J.
Morris, James Maury, Jr.	Met.E., '43	Pittsburgh
Morrison, Marcy Lee	Ch.E., '44	Buffalo, N.Y.
Morrow, Bertram Howard	Bus., '43	Easton
Morse, Arthur Holmes, Jr.	Arts, '44	Cincinnati, O.
Morse, William Howard	M.E., '41	Pittsburgh
Mortimer, Ewen Montford	Ch.E., '43	Bethlehem
Mosier, Laurance Austin	Arts, '44	Chevy Chase, Md.
Moss, Ralph Franklin, Jr.	Bus., '42	Merion
Moss, Robert Irwin	C.E., '44	Brooklyn, N.Y.
Mostyn, Thomas Albert	I.E., '41	Hamilton Square, N.J.
Motter, John Wesley	Met.E., '44	Towson, Md.
Mowen, John Henry	Bus., '41	Chatham, N.J.
Moyer, James English	Bus., '44	Glenside
Moyer, Ralph David	Ch.E., '44	Bogota, N.J.
Moyer, Richard Berliner	Phys., '41	Wyomissing
Muehlberg, John Richard	Bus., '42	Montclair, N.J.
Mueller, John Haines	M.E., '43	York
Mueller, Richard William, Jr.	I.E., '41	Pittsburgh
Muhlhausen, Edgar Kirton	C.E., '42	Brooklyn, N.Y.
Mulhern, James Paul	Bus., '43	Wilkes-Barre
Muller, Herbert Matthew	Ch.E., '44	Bergenfield, N.J.
Mundorf, George	Arts, '43	York
Munnikhuyzen, Richard Dallam	E.E., '42	Bel Air, Md.
Munroe, Stewart Walrath, Jr.	Bus., '42	Grosse Pointe, Mich.
Muraca, Raffaele Francesco	Chem., '43	Easton
Murray, Glenn Allan	M.E., '44	Larchmont, N.Y.
Murray, Richard Livingstone	M.E., '44	Westfield, N.J.
Musante, Joseph Fitzroy	Bus., '43	Bridgeport, Conn.
Musselman, Richard Thomas	Bus., '41	Bethlehem
Musselman, William Behl	Arts, '42	Bethlehem
Mussina, Robert Dexter	I.E., '44	Williamsport
Myers, Raymond Reeve	Arts, '41	New Oxford
Nace, Harold Russ	Chem., '43	Haddonfield, N.J.
Nadig, Frederick Walter	Ch.E., '41	Allentown
Needles, James Warden	Ch.E., '42	Cape May, N.J.
Neill, Alexander Bold, Jr.	Chem., '41	Upper Montclair, N.J.
Nelken, Hans	M.E., '43	New York, N.Y.
Nelson, William Albert	Bus., '43	New York, N.Y.
Nestleroth, Paul Lavern	Met.E., '42	Elm
Neuber, Robert William	E.E., '44	Drexel Hill
Neuendorffer, Carl	M.E., '43	North Tarrytown, N.Y.
Neureuter, Howard Raymond	Bus., '44	Buffalo, N.Y.
Newcomb, Robert Shaw	Bus., '42	South Orange, N.J.
Newhard, Raymond Amandus	Bus., '41	Northampton
Neyhart, Cyril Anthony	I.E., '42	Allentown
Nichols, David Kierstead	I.E., '42	Nutley, N.J.
Nicrosini, Robert Alexander	Arts, '43	Bayside, L.I., N.Y.
Nielsen, Howard Leroy	M.E., '42	Chicago, Ill.
Niemeyer, James Walter	Ch.E., '43	Dunmore
Nitti, John James	Bus., '42	Brooklyn, N.Y.
Nolf, Jacob Sebastian	I.E., '43	Nazareth

STUDENTS

Nolte, Frederic Stuart	M.E., '42	Park Ridge, Ill.
Norlin, Charles MacMillan	Met.E., '43	Shaker Heights, O.
Norris, Kenneth Harold, Jr.	I.E., '43	Maplewood, N.J.
Norwood, John Hugh	Met.E., '42	Hamburg, N.Y.
Nothstein, Louis Israel	Ch.E., '44	Mauch Chunk
Novitski, Frank	Ch.E., '41	New York, N.Y.
Nowicki, Zenon Edwin	Bus., '42	Bethlehem
Nutting, James Barrett	Arts., '43	West Roxbury, Mass.
Nylin, Robert Eugene	Bus., '44	Rockville Centre, N.Y.
Oberholzer, Ernest Rudolf	Ch.E., '41	Allentown
O'Brien, Joseph Francis	Arts., '44	Jersey City, N.J.
Ockelmann, Howard Henry	Ch.E., '44	Union City, N.J.
O'Hara, John Brangs	Bus., '42	Newark, N.J.
Ojserkis, Benjamin	I.E., '41	Atlantic City, N.J.
Okamoto, Allen Hisayoshi	Ch.E., '42	Willow Grove
Olinsky, Harry William	Bus., '43	Trenton, N.J.
Oliphant, Lowell Kenneth	Bus., '42	East Cleveland, O.
Olmstead, Harry Lester	M.E., '43	Staten Island, N.Y.
Olson, Henry J., Jr.	C.E., '42	Oyster Bay, N.Y.
O'Neill, Frank Robert	M.E., '44	Drexel Hill
Osborn, David Chittenden	Ch.E., '42	Shaker Heights, O.
Ost, Henry Christian, Jr.	Bus., '44	Pottsville
Ostheimer, Richard	Met.E., '41	Rockville Centre, N.Y.
Oswald, Joseph Howard	Bus., '44	Nutley, N.J.
Ottens, Robert Constantine	E.E., '44	Allentown
Otto, Henry Habel, Jr.	Bus., '43	Scranton
Over, Arthur Mead	M.E., '43	Pittsburgh
Owen, Wilfred Robert	Ch.E., '43	Grosse Pointe, Mich.
Owens, Lester Eugene	Bus., '43	Derrick City
Oyler, Robert Lee	Ch.E., '44	Mercersburg
Paddock, Robert Martin	Bus., '44	Wolcott, N.Y.
Page, Lewis Franklin	E.E., '44	Pelham, N.Y.
Paget, Allen Maxwell	Bus., '41	Harrisburg
Palazzo, Ralph Dominick	C.E., '43	Trenton, N.J.
Palmer, Elbridge William	Bus., '43	Kingsport, Tenn.
Palmer, Richard Bradbury	Arts., '43	Bethlehem
Palmer, Richard Mercer	Bus., '42	Reading
Parish, Donald Bruce	Bus., '43	Portville, N.Y.
Parker, Reginald Schlegel	Phys., '44	Allentown
Parkinson, Ralph Bruce	M.E., '43	Glenside
Parr, Preston, Jr.	Ch.E., '43	Wyncote
Parsons, Arthur Barrette, Jr.	Bus., '43	Scarsdale, N.Y.
Parsons, George Earl, Jr.	E.E., '42	Marion, Md.
Parsons, John William	E.E., '44	Palmyra, N.J.
Parvis, Preston Wilson, Jr.	Bus., '42	Wilmington, Del.
Patten, Charles Anthony	M.E., '42	Allentown
Paul, Richard Chadwick	Arts., '42	York
Payrow, Harry Gordon, Jr.	Bus., '43	Bethlehem
Peacock, Bruce McKenzie	M.E., '44	Bethlehem
Pearsall, Mason Pratt	Ch.E., '43	New Canaan, Conn.
Pearson, William Cecil	Bus., '43	Bethlehem
Peck, Charles Karl, Jr.	Bus., '43	New York, N.Y.
Peck, William Jarvis	I.E., '43	Riverside, Conn.
Pedrick, Alfred Winslow	Bus., '43	Millville, N.J.
Pegg, Robert Frack	M.E., '43	Coraopolis
Pelzel, Charles Lehmann	M.E., '44	Charleston, W.Va.

Penitsch, Leonard Francis	Bus., '43	Allentown
Penn, John Roby, III	Bus., '43	Fort Worth, Tex.
Perrill, John Joseph	M.E., '43	Garden City, N.Y.
Peters, Leon Mack	M.E., '44	Allentown
Peters, Theodore, Jr.	Ch.E., '44	Chambersburg
Petersen, Richard Gray	Arts, '43	Pittsburgh
Peterson, George Welch, Jr.	Bus., '41	Ridgewood, N.J.
Peterson, John Louis	Met.E., '42	Wood-Ridge, N.J.
Pfeffer, James Fisher, Jr.	M.E., '42	Brookline
Phelan, James Mitchell	Chem., '41	St. Davids
Phillips, George Wesley	E.M., '43	Edgeworth
Phillips, John Ormsby	Bus., '42	Pittsburgh
Piazza, Joseph Leonard	E.E., '44	Great Neck, N.Y.
Pillar, William John	Met.E., '44	Bethlehem
Pinto, Eugene LeRoy	Bus., '43	Scarsdale, N.Y.
Plante, Leon Henry	Arts, '41	Fitchburg, Mass.
Plucker, Julius, III	Ch.E., '41	Belvidere, N.J.
Pohl, Henry Ernst, Jr.	Ch.E., '43	St. Albans, L.I., N.Y.
Polinsky, John Richard	Arts, '42	Mildred
Pollock, Robert Edward	Bus., '43	Elmira, N.Y.
Ponisi, Harry Paul, Jr.	Ch.E., '44	Somerville, N.J.
Poole, Davis Thomas, Jr.	I.E., '44	Rockville Centre, N.Y.
Porter, Kenneth, Jr.	Bus., '43	Rockville Centre, N.Y.
Postel, Henry Christian	E.E., '43	Brooklyn, N.Y.
Potter, George Richard	I.E., '44	Larchmont, N.Y.
Powers, Phillip Henry, Jr.	M.E., '43	Pittsburgh
Prang, Philip John, Jr.	Chem., '43	Easton
Prelle, Walter Valentine	Bus., '42	Old Greenwich, Conn.
Price, Alan Edward	Arts, '43	Pittsburgh
Price, James Bruce, Jr.	Met.E., '43	Bethlehem
Priestley, Robert Joseph	Ch.E., '44	Neptune, N.J.
Prinkey, Clarence Orland	M.E., '43	Yonkers, N.Y.
Prinkey, John Ward, Jr.	I.E., '41	Yonkers, N.Y.
Priolo, Louis Anthony	Met.E., '41	Bethlehem
Pritchard, James Flory	Ch.E., '44	Bangor
Probst, John Joseph	I.E., '44	New York, N.Y.
Propper, Theodore David	Bus., '42	Woodmere, N.Y.
Prudden, Peter, Jr.	Bus., '41	Palm Beach, Fla.
Pruett, Samuel Clifton	Ch.E., '44	Teaneck, N.J.
Pugh, Robert Willmar	Ch.E., '43	Great Notch, N.J.
Putnam, Arnold Oscar	I.E., '43	Springfield, Vt.
Quincy, John Adams	E.E., '42	Briarcliff Manor, N.Y.
Quinn, Joseph Henry	Bus., '41	Baltimore, Md.
Rader, Jack Burdell	I.E., '44	Bethlehem
Rahn, Kenneth Hauser	Met.E., '42	Palmerton
Rahn, Richard Levan	Ch.E., '44	Allentown
Raidline, Clifford Thomas	E.E., '44	Bethlehem
Rajcok, Paul George	I.E., '43	Bethlehem
Rambert, Gordon Arthur	Met.E., '44	Rochester, N.Y.
Ramsdell, Robert Cole	Arts, '43	Trenton, N.J.
Ramsden, George	Arts, '44	West Orange, N.J.
Randall, George Watson	C.E., '44	Fairmont, W. Va.
Randall, Lewis Parker, Jr.	E.E., '41	Trenton, N.J.
Rankin, William Graham	Bus., '44	Jamaica, N.Y.
Ransom, John Thompson, II	Phys., '42	Haddonfield, N.J.
Rappuhn, Henry Wallace	E.E., '43	Great Neck, N.Y.

STUDENTS

Rasmussen, Richard George	Bus., '41	Garden City, N.Y.
Rassiga, Everett Dolph	Arts, '44	New York, N.Y.
Rassler, Theodore Alvin	Ch.E., '44	Allentown
Ray, Paul James	M.E., '44	Bethlehem
Raymer, John Eberlin, Jr.	Ch.E., '44	Arecibo, Puerto Rico
Read, John Arnold	M.E., '42	Upper Montclair, N.J.
Reber, Clarence George	M.E., '41	Reading
Reber, Robert Clark	Bus., '41	Allentown
Reddert, Earl John, Jr.	Arts, '43	Madison, N.J.
Redington, Malachi Joseph	Bus., '44	Wilkes-Barre
Redman, Theodore Hosmer	Phys., '42	Louisville, Ky
Reed, Jesse Edward	Ch.E., '44	McKeansburg
Reese, Robert William	Arts, '41	Winnetka, Ill.
Regan, Charles Daniel	Ch.E., '44	East Hampton, N.Y.
Reiber, Paul Leslie, Jr.	Met.E., '44	Pittsburgh
Reichard, John Samuel	Bus., '43	Allentown
Reichenbach, Harry Archibald, Jr.	E.M., '42	Bethlehem
Reid, Sumner Willard	M.E., '42	Westlawn
Reifsnyder, H. Nelson, Jr.	E.E., '44	Norristown
Reiley, James Lowther	Bus., '42	Clearfield
Reimer, Leon George	E.E., '43	Bath
Reineking, George Barton	M.E., '44	Arlington, N.J.
Reischer, James Clyde	E.E., '44	Chester
Remsen, Irving Baker, Jr.	Ch.E., '43	Trenton, N.J.
Remsen, William Kouwenhoven	I.E., '43	Staten Island, N.Y.
Renker, Rudolph Louis	Bus., '41	Totowa Boro, N.J.
Rentz, Donald John	Bus., '43	West Lawn
Ressler, Robert Roland	Chem., '44	Allentown
Reuwer, Henry Thomas	Bus., '42	Harrisburg
Reynolds, Joseph Benson, Jr.	Phys., '42	Bethlehem
Rhoads, Ralph Henry	E.E., '44	Allentown
Rhoads, William Painter	M.E., '42	Harrisburg
Rhodes, Franklin Jackson	I.E., '44	Bloomfield, N.J.
Rich, Arthur Herbert	Bus., '42	Palm Beach, Fla.
Rich, Douglas Chase	Arts, '44	Cato, N.Y.
Rich, Francis Marion, II	Arts, '42	Gainesville, Ga.
Rich, Frank Hart	Bus., '42	Washington, D.C.
Richards, David, Jr.	Ch.E., '41	Scranton
Richards, David Emrys	Arts, '42	Scranton
Richards, Hugh Warren	Ch.E., '43	Union, N.J.
Riddle, Wayne Dixon	Arts, '43	Bethlehem
Ried, George Horace	Arts, '43	New York, N.Y.
Rieger, Warren Charles	Ch.E., '44	Staten Island, N.Y.
Riehl, James Hamilton	Bus., '44	Fredonia, N.Y.
Riemer, Howard William	Bus., '42	Maplewood, N.J.
Riemony, Augustus Anthony	Ch.E., '41	Fleetwood
Riley, John Traver	Bus., '41	Bethlehem
Riley, Joseph Tully	M.E., '42	Bethlehem
Ripley, Robert Samuel, Jr.	E.M., '44	West Norwood, N.J.
Ristorcelli, Joseph Raymond	Ch.E., '44	Maracaibo, Venezuela, S.A.
Ritchie, George Moland, Jr.	M.E., '41	Abington
Ritchings, Robert Arthur	C.E., '41	Overbrook Hills
Ritter, Charles Martin, Jr.	Ch.E., '44	Allentown
Ritter, Thomas James	Arts, '41	Allentown
Ritter, William Edward, Jr.	M.E., '43	Plains
Roach, John Marvil	Arts, '42	Merchantville, N.J.

Robb, Arthur Thomas	Ch.E., '43	Rockville Centre, N.Y.
Roberson, Robert Errol	Chem., '44	Teaneck, N.J.
Roberts, Frank Frederick	Met.E., '42	Bethlehem
Roberts, Gordon Thomas	E.E., '44	New York, N.Y.
Roberts, Samuel Wallace, Jr.	I.E., '44	Elkins Park
Robertson, Charles Thompson, III	Bus., '42	Philadelphia
Robertson, Gordon Brown	Bus., '42	Cleveland Heights, O.
Robeson, Philip Baker	I.E., '41	Merchantville, N.J.
Robinson, Donald Worthington	M.E., '43	Buffalo, N.Y.
Robinson, Ross Brown	Chem., '44	Kingsport, Tenn.
Robinson, Walter Rossiter, Jr.	Ch.E., '44	Wilmington, Del.
Rockett, Francis Haynes, Jr.	E.E., '42	Rockville Centre, N.Y.
Rodenbach, Donald Eston	Bus., '43	Bethlehem
Rodgers, Douglas Hill	C.E., '42	Port Washington, N.Y.
Rodgers, Philip Austin	Bus., '41	Chester
Rodgers, Robert Elliott	Ch.E., '43	Allentown
Roedder, Edwin Woods	Arts, '41	Devon
Rogers, Charles Montgomery	Bus., '44	Dallas, Tex.
Romberger, Gilbert Daniel	Arts, '44	Allentown
Romig, John Ramsay	I.E., '41	Allentown
Rosenberg, Gilbert Morris	E.E., '44	Bethlehem
Rosener, Alfred Lincoln, Jr.	C.E., '44	West Deal, N.J.
Rosenquest, Robert William	Bus., '41	Essex Fells, N.J.
Rosenthal, Charles Fuld	E.E., '44	Scranton
Roslund, Arthur Elford	M.E., '43	Flushing, L.I., N.Y.
Rospond, Robert Thaddeus	Met.E., '44	Irvington, N.J.
Ross, John Alexander	Ch.E., '44	WilliamSPORT
Roth, Richard Charles	I.E., '43	Buffalo, N.Y.
Rothlisberger, George Albert	Arts, '44	East Orange, N.J.
Rouse, Robert Wilson	M.E., '43	Colorado Springs, Colo.
Rowand, Robert Ellwood	Arts, '42	Swarthmore
Ruch, Austin William	Ch.E., '42	Schnecksville
Ruffle, Clyde Charles	I.E., '42	Queens Village, N.Y.
Rugg, Clayton Anthony, Jr.	Bus., '44	Lakewood, N.Y.
Rumsey, Robert Seymour	Arts, '43	Bloomfield, N.J.
Ruzza, Henry George	E.M., '43	Livingston, N.J.
Ryan, John Donald	Bus., '43	Norristown
Ryan, Robert Francis	Bus., '42	Schenectady, N.Y.
Ryle, John, Jr.	Bus., '41	Paterson, N.J.
Sabatino, Arthur Justin	Ch.E., '44	Elizabeth, N.J.
Saemmer, Joseph Peter	Bus., '44	Bethlehem
Saitta, Phillip Wales, Jr.	Bus., '43	Lebanon
Samer, Rudolf William	Phys., '42	Elizabeth, N.J.
Samuels, Abram	Bus., '42	Allentown
Sanders, Donald George	M.E., '43	Passaic, N.J.
Sanders, Paul William	M.E., '44	Maplewood, N.J.
Sanders, Robert Lewis	I.E., '44	New Cumberland
Sanderson, Clarence Marcellus, Jr.	E.E., '42	South Orange, N.J.
Sands, Donald Belshaw	Arts, '43	Middlebury, Conn.
Santantonio, Anthony Joseph	M.E., '43	Pen Argyl
Sauer, Richard Winfield	Ch.E., '43	Haddon Heights, N.J.
Saulnier, Theophile, Jr.	Bus., '42	Swarthmore
Savage, Charles Henry	Met.E., '42	Morristown, N.J.
Sawyer, James Lewis	Ch.E., '43	York
Saylor, John Seltzer, Jr.	Ch.E., '42	Reading
Saylor, Robert Webster	M.E., '43	Harrisburg

STUDENTS

Schaeffer, George Henry, Jr.	E.E., '41	Reading
Schaeffer, William Dwight	Chem., '43	Laureldale
Schaffer, Robert Lynd	Bus., '43	Ambler
Schall, Josef William	Ch.E., '41	Sellersville
Schantz, Robert Mack	Bus., '43	Allentown
Schaper, David Henry	C.E., '43	Erie
Schneck, Richard Grey	Ch.E., '43	Rutherford, N.J.
Schineller, Fred John	Met.E., '41	Bergenfield, N.J.
Schmoll, William Rudolph	C.E., '43	Bethlehem
Schmoyer, Robert Kistler	Ch.E., '44	Schnecksville
Schmuk, Joseph	Met.E., '44	Easton
Schneider, George Joseph	Bus., '43	Demarest, N.J.
Schneider, John, III	Bus., '42	Cambridge, Md.
Schneider, Leonard Adolph	Arts, '42	Clifton, N.J.
Schnell, William Rodman	I.E., '41	Croton-on-Hudson, N.Y.
Schoch, Richard Luther	Bus., '44	Allentown
Schoen, Donald Robert	Arts, '41	Mount Vernon, N.Y.
Schork, Ernest Leonard	Ch.E., '41	Maplewood, N.J.
Schram, Irwin Herbert, Jr.	Ch.E., '44	Glen Rock, N.J.
Schramm, Wilson Bohnett	M.E., '43	Bayside, N.Y.
Schroeder, Howard Oscar	M.E., '42	Bloomfield, N.J.
Schumacher, Charles Henry	I.E., '42	Jackson Heights, N.Y.
Schumacher, Forrest Veil	Arts, '42	Bellevue
Schutt, Herbert Owen	M.E., '44	Easton
Schwab, Carl Maxwell	Ch.E., '44	Allentown
Schwab, Leonard Charles	M.E., '44	Cumberland, Md.
Schwab, Warren Joshua	Met.E., '43	Freemansburg
Schwartz, James Sechler	M.E., '44	Hazleton
Schwarz, Louis Kossuth, Jr.	Bus., '41	Newark, N.J.
Schwarz, Mark Herman, Jr.	Bus., '44	Lake Hopatcong, N.J.
Schwarz, Quirin John	M.E., '44	Rutherford, N.J.
Schwarz, Robert Adolph	Arts, '44	Westfield, N.J.
Scoblionko, David Phineas	Arts, '44	Bethlehem
Scott, Joseph Doty	E.E., '42	Millburn, N.J.
Scott, Theodore Gourdin, Jr.	Met.E., '42	Orange, Va.
Scott, William Elliott	Bus., '41	Westfield, N.J.
Scouller, John Donald	Bus., '44	Philadelphia
Seals, Richard Bell	Arts, '44	Newton, N.J.
Sears, Murl Wolfe	M.E., '42	Catonsville, Md.
Seaton, Peter Charles	C.E., '44	Allentown
Sebold, Grandon Kenneth	E.E., '42	Elizabeth, N.J.
Seebald, Henry Albert	Arts, '42	Allentown
Sefranek, Louis Anthony	Met.E., '44	Bethlehem
Segal, Jacques, II	I.E., '42	Flushing, N. Y.
Seib, Charles Bach, Jr.	Arts, '41	Allentown
Seigle, Harold Joseph	Ch.E., '44	Philadelphia
Selkregg, Frederick Mills, Jr.	Bus., '44	Plainfield, N.J.
Seltzer, Richard Creighton	Bus., '41	Overbrook
Senten, Wallace Alfred	Met.E., '44	New York, N.Y.
Sentz, Lemuel Ellsworth	Ch.E., '41	Felton
Seward, Nym Kenneth	Ch.E., '44	Luzerne
Seward, Russell Melvin, Jr.	Arts, '42	Altoona
Sexton, Joseph Matthew	Arts, '42	Newark, N.J.
Seyfried, Warren Raymond, Jr.	Arts, '42	Coopersburg
Shafer, James Alan	Arts, '43	Easton
Shafer, Richard Charles	M.E., '44	Allentown

Shaffer, Rodney Daniel	Ch.E., '43	Allentown
Sharpe, Louis Everett	Phys., '42	Larchmont, N.Y.
Shaw, Stanford Henry	Bus., '44	South Orange, N.J.
Shawhan, Hubbard William	Ch.E., '44	Charleston, W.Va.
Sheevers, Harry Peter	Ch.E., '44	Yonkers, N.Y.
Sheibley, John William	Met.E., '41	Florin
Sheldon, Smith	I.E., '44	Belleville, N.J.
Shepherd, Richard Montgomery	Ch.E., '41	Wayne
Sherwood, Harold DeWitt	Ch.E., '44	Englewood, N.J.
Sheska, Martin	Met.E., Spl.	Northampton
Shintaku, Toshiaki	C.E., '44	Pahala, Hawaii
Shively, Robert Rex	Ch.E., '43	Washington
Shuttleworth, Edwin Irving	Ch.E., '43	Philadelphia
Shuttleworth, William Sydney	Bus., '42	Scarsdale, N.Y.
Sickler, Joseph Benjamin	Arts, '44	Fair Haven, N.J.
Siebecker, Carl Edward, Jr.	Bus., '43	Bethlehem
Siegele, William Augustus	Ch.E., '41	Caldwell, N.J.
Sieger, Charles Elias	Met.E., '43	Allentown
Siegfried, Robert Edwin	Ch.E., '43	Allentown
Silfies, Kerwin Howard	Bus., '43	Bethlehem
Silverberg, Jonas	Bus., '41	Bethlehem
Simonsen, Robert Niel	Ch.E., '42	Mount Lebanon
Simpson, Arol John	Ch.E., '44	Stratford, Conn.
Simpson, James Robert, III	M.E., '44	Ambler
Simpson, William Brown	Arts, '41	Elizabeth, N.J.
Sipp, John Louis Francis	Arts, '41	New York, N.Y.
Skilling, John Morrison, Jr.	Bus., '44	Wilmington, Del.
Skinner, William James	M.E., '42	Madison, N.J.
Slack, Edgar Chester	Arts, '41	Toms River, N.J.
Slee, Richard Edmund	Arts, '41	Stroudsburg
Sliwka, Stanley Edward	Arts, '41	Bayonne, N.J.
Smith, Andrew Peter	Met.E., '43	Bethlehem
Smith, Augustine Nicholas, Jr.	Chem., '42	Mahanoy City
Smith, Cephas Cornelius	Bus., '41	Baltimore, Md.
Smith, David Rahm, Jr.	E.E., '42	Towanda
Smith, Douglas Carleton	M.E., '44	Glen Ridge, N.J.
Smith, Eugene Monroe	Met.E., '42	Philadelphia
Smith, Frank Edgar, Jr.	Ch.E., '42	Clifton, N.J.
Smith, Gilman Brayton, III	Arts, '44	Montclair, N.J.
Smith, Jared Scott	Ch.E., '43	Spring Valley
Smith, Jesse Tavenor	I.E., '42	Shaker Heights, O.
Smith, John David	Bus., '44	Garden City, N.Y.
Smith, Joseph Earl, Jr.	M.E., '43	Philadelphia
Smith, Kenneth Herbert	E.E., '42	Bethlehem
Smith, Peter Carlton	Arts, '43	Blatimore, Md.
Smith, Richard Phillip Steere	I.E., '42	Philadelphia
Smith, Robert Chadwick	Ch.E., '44	Allentown
Smith, Robert Lee, Jr.	E.E., '44	Frederick, Md.
Smith, Robert Louis	C.E., '44	Charleston, W.Va.
Smith, Victor Eugene	Bus., '42	Norwalk, Conn.
Smoke, Stephen David	Arts, '41	Versailles
Smyth, Burd Edwards	Bus., '41	Pottsville
Smyth, John Archibald	Arts, '43	Merchantville, N.J.
Snovel, Ellis Raymond, Jr.	M.E., '41	Easton
Snyder, Clinton Creveling	M.E., '41	Scranton
Snyder, George Whitney	Arts, '44	Sewickley

STUDENTS

Snyder, Samuel Idell	Ch.E., '44	Windber
Snyder, Wilson Pershing	Bus., '44	Minersville
Somers, John Joseph	Ch.E., '42	Philadelphia
Soprano, Quentin Cletus	M.E., '43	Allentown
Sotzing, Ralph Franklin	Bus., '42	Bethlehem
Soule, Harvey Francis	Ch.E., '44	Albany, N.Y.
Southgate, Leslie Orman, Jr.	M.E., '42	Jamesburg, N.J.
Spears, William McIndoe, Jr.	Arts, '42	Shaker Heights, O.
Spengler, Emerson Daniel	Met.E., '42	Northampton
Spilman, Robert Bruce	M.E., '41	Washington, D.C.
Spirk, John Francis	Met.E., '43	Bethlehem
Spradling, Richard DeWitt	Arts, '44	Buenos Aires, Argentina, S.A.
Springer, Eugene Roy	M.E., '42	Houston, Tex.
Stacom, Matthew John Francis, Jr.	Arts, '41	Flushing, L.I., N.Y.
Stahl, Charles Wesley	Ch.E., '43	Bethlehem
Stair, Sherman	Bus., '44	Rosemont
Starke, Edward William, Jr.	Chem., '43	Ridgewood, N.J.
Stearns, Clarence Arthur, Jr.	Arts, '43	Philadelphia
Steele, David Truman	I.E., '44	Plandome, L.I., N.Y.
Steele, Robert Breckinridge, Jr.	Met.E., '42	Great Neck, N.Y.
Steiner, Charles Stanley	Ch.E., '42	Baltimore, Md.
Stephens, James Clayton	Bus., '41	Hamden, Conn.
Stephens, Orville James	Bus., '43	Cranford, N.J.
Stern, Robert Gottlieb	Phys., '41	Mount Carmel
Stevancsecz, Julius Victor	E.E., '44	Bethlehem
Stickel, Robert John	C.E., '43	West Orange, N.J.
Stieglitz, Henry Charles	M.E., '43	Jamaica, N.Y.
Stives, John Henry	I.E., '42	White Plains, N.Y.
Stockbridge, John Montague	M.E., '43	Baltimore, Md.
Stoeckle, William Charles	M.E., '44	Drexel Hill
Stoehr, Roland Clifford	Bus., '43	Bayside, N.Y.
Stokes, John Stogdell, Jr.	I.E., '43	Huntingdon Valley
Stone, Edward James	I.E., '42	New York, N.Y.
Stone, George Chickering	Arts, '43	Pawling, N.Y.
Stoneback, Ralph Daniel	Bus., '41	Quakertown
Storch, Tracy Frederick	Ch.E., '44	Allentown
Stotz, Carl Clemens	E.E., '41	Easton
Stoudt, Robert Paul Mader	Bus., '41	Riegelsville
Stowbridge, Robert Walter, III	Bus., '42	Roselle Park, N.J.
Stowers, Eugene Sewell, Jr.	I.E., '44	Bluefield, W.Va.
Strachle, William Thomas	Ch.E., '43	Jamaica Estates, N.Y.
Street, Rodman Egbert	Ch.E., '44	York
Strenkofsky, Henry Joseph	Bus., '41	Frackville
Streuli, Carl Arthur	Chem., '43	Tuckahoe, N.Y.
Strickland, Everett Carlton	E.E., '41	Cranbury, N.J.
Strode, Richard Brinton	Ch.E., '41	West Chester
Strouse, William Moss	E.E., '43	Harrisburg
Struble, Robert Samuel	M.E., '42	Ben Avon
Stubbings, Robert Lamb	Chem., '41	Dobbs Ferry, N.Y.
Stuber, Bernard Valentine	M.E., '41	Buffalo, N.Y.
Stump, William Lester	Ch.E., '43	Bethlehem
Stupp, John Phelps	Bus., '43	Clayton, Mo.
Sturgis, Carl Lindsley	Bus., '42	Morristown, N.J.
Sultzter, William Robb	Arts, '43	Mount Vernon, N.Y.
Summers, Oscar Davis	E.E., '44	Oyster Bay, N.Y.

Summers, Thomas Gillmer	Arts, '44	Warren, O.
Sutherland, Edward Anderson	M.E., '41	White Plains, N.Y.
Swartz, Henry Carpenter, Jr.	M.E., '43	Gwynedd Valley
Swayne, Kenneth Gilbert	M.E., '44	George School
Sweet, Philip Anthony, Jr.	M.E., '44	Scranton
Swoyer, Robert Stanley	Ch.E., '43	Allentown
Szabo, Frank Anthony	Bus., '41	Bethlehem
Szymakowski, Stanley Chester	Bus., '44	Greenfield, Mass.
Tabor, George Carl	Ch.E., '43	Boyertown
Tait, Gordon Edward	I.E., '41	Wood-Ridge, N.J.
Talbot, Duncan Arthur, Jr.	Met.E., '44	Rahway, N.J.
Tallaksen, Arthur	Bus., '42	West Orange, N.J.
Tambella, Roger Alfred	Arts, '44	Canadensis
Tangel, Julius Edward	E.E., '41	Cranford, N.J.
Taylor, Charles Baker, Jr.	C.E., '41	Short Hills, N.J.
Taylor, Frank Martin	Bus., '44	Wilmington, Del.
Taylor, John Peyton	Bus., '41	Wilmington, Del.
Taylor, Maurice Eugene	Ch.E., '41	Jermyn
Taylor, Ray Orme	Bus., '42	Ashland
Taylor, Robert Gorman	M.E., '42	North Hills
Taylor, Robert Linkletter	Arts, '43	Short Hills, N.J.
Taylor, William Roberts	Arts, '43	Bethlehem
Temoshok, Michael	E.E., '41	Northampton
Templeton, Kenneth Roderick	Bus., '41	Easton
Teufer, Boyd Ullmann, B.S. (<i>Moravian College</i>)	Arts, '42	Bethlehem
Thaeder, Frank Raymond	I.E., '42	Manhasset, N.Y.
Thalhamer, Albert Leo	Phys., '42	Clifton, N.J.
Thayer, Bruce William	M.E., '44	Evanston, Ill.
Thayer, Nathan Townsend, Jr.	Bus., '44	Flushing, N.Y.
Thevenet, Paul Vernor	Bus., '44	Bethlehem
Thomas, Alvah Hummer	Met.E., '41	Hackettstown, N.J.
Thomas, Joseph Pidgeon, Jr.	Bus., '43	Haddonfield, N.J.
Thomas, Joseph Simon	Arts, '42	Flushing, N.Y.
Thomas, Philip Adams	Ch.E., '43	Scranton
Thomas, Warren Harding	Ch.E., '44	Bethlehem
Thomas, Willis Grant, Jr.	Arts, '44	Allentown
Thompson, Charles McDowell	I.E., '43	Rockey River, O.
Thompson, Graham Fellowes, Jr.	Bus., '41	New Haven, Conn.
Thomson, Albert Harvey	Bus., '44	Dallas City
Thornburgh, Charles Garland, Jr.	Arts, '42	Roslyn Farms
Thurn, John Alexander	M.E., '43	Philadelphia
Tift, Archie DeWitt	Bus., '42	Medford Lakes, N.J.
Tift, John Alden, Jr.	Bus., '41	Medford Lakes, N.J.
Tilghman, William Beauchamp, III	C.E., '44	Salisbury, Md.
Tillberg, Frederick Carl, Jr.	Met.E., '42	Philadelphia
Tilley, Harold Widdall	Bus., '44	Avoca
Tilley, John Alvyn	Bus., '41	Avoca
Tilton, Robert Lansing	Ch.E., '41	Toms River, N.J.
Titlow, Lester Edwin	M.E., '43	Allentown
Titlow, Walter Stockton, Jr.	E.E., '43	Norristown
Todd, Alfred Howe	C.E., '44	Richmond, Va.
Tokarczyk, Florent Joseph	E.M., '42	Coaldale
Tolley, William Wooster	Ch.E., '42	Richmond Hill, N.Y.
Tomkinson, Walter Scott	Bus., '43	Glenside
Tomkovich, John Michael	Ch.E., '41	South River, N.J.

STUDENTS

Tomlinson, Joseph Newkirk	Ch.E., '44	Bridgeton, N.J.
Toohy, William Joseph, Jr.	Ch.E., '41	Bethlehem
Townsend, John Platt	M.E., '43	Glen Ridge, N.J.
Transue, John Henry	Chem., '42	Portland
Trappe, Walter, Jr.	Bus., '44	Glen Ridge, N.J.
Treco, Richard Mitchell	Met.E., '43	North Quincy, Mass.
Treese, Townsend Newton	Bus., '43	Pittsburgh
Tremel, Paul Stephen	Bus., '44	Bethlehem
Tromer, Albert George	Bus., '43	New York, N.Y.
Trone, Kenneth William	Bus., '42	York
Troxel, David Irvin	E.E., '43	Quakertown
Troy, James Luke	Bus., '44	Washington, D.C.
Troy, John Parker	E.E., '43	Schenectady, N.Y.
Tucker, Albert Robert, Jr.	Ch.E., '43	Wilmington, Del.
Turnauer, Robert Franklin	Bus., '42	Allentown
Ulmer, Robert Mason	Bus., '41	Gibbstown, N.J.
Urschitz, John Frank	E.E., Spl.	Easton
Vachon, Ross Peter	Bus., '43	New Haven, Conn.
Valenzuela, Gustavo Mario	Met.E., '41	Santiago, Chile, S.A.
Valleau, Robert John	Ch.E., '41	Teaneck, N.J.
VanBlarcom, John Davis	M.E., '42	Aliquippa
VanBlarcom, Warren Corbin, Jr.	Bus., '41	Aliquippa
VanBrunt, Chester Arthur	Bus., '41	Rumson, N.J.
Van Cleve, John William	Bus., '44	Haddonfield, N.J.
Vander Clock, William Albert	Bus., '41	Ridgewood, N.J.
Van der Veer, Lindsay Dodd	I.E., '42	Somerville, N.J.
Van Vliet, Stewart, Jr.	Arts, '44	Shrewsbury, N.J.
Vargo, William Joseph	Bus., '44	Bethlehem
Varner, William Paul	Bus., '42	Scranton
Varrichio, Philip Thomas	Bus., '43	Allentown
Velie, Earl Robert	E.M., '44	Painted Post, N.Y.
Verbeet, Martin Gerrit	Bus., '44	Staten Island, N.Y.
Vetrotsky, Albert Eugene	Arts, '44	Bethlehem
Vetrotsky, Stephen Thomas	Bus., '44	Bethlehem
Vitelli, Vito Joseph	M.E., '44	Trenton, N.J.
Vockel, Richard Landis	M.E., '41	Pittsburgh
Vogel, Fred Henry	Ch.E., '41	Hoboken, N.J.
Vogelsberg, Walter Herbert	E.E., '41	Orange, N.J.
Vogt, Stuart Henry	E.E., '42	White Plains, N.Y.
Vollmer, Harold Otto	Ch.E., '43	Roosevelt, L.I., N.Y.
Von Block, Albert Francis	Bus., '43	Plainfield, N.J.
Vosbury, Richard Francis	Bus., '44	Falls Church, Va.
Waer, Richard Rolland	E.E., '43	Easton
Walborn, George Jacob	Bus., '44	Reading
Walker, Robert Louis	I.E., '43	East Orange, N.J.
Walker, Samuel Robert	Bus., '42	Riverside, N.J.
Walker, William Comstock	Ch.E., '43	Milwaukee, Wis.
Wallace, Thomas Alexander, Jr.	Chem., '42	Kew Gardens, L.I., N.Y.
Wallick, Earle Wilbur	E.E., '44	Washington, D.C.
Walling, Richard Raymond	E.E., '43	East Cleveland, O.
Walsh, Gerald Edward, Jr.	C.E., '44	Roselle, N.J.
Walter, Edward Louis	Ch.E., '43	Fort Lee, N.J.
Walters, Merlin Paul	M.E., '44	Fullerton
Walton, Harry Beames	Ch.E., '44	Asbury Park, N.J.
Wanich, Glenn Creasy	Ch.E., '43	Bloomsburg
Wantuck, Joseph Anthony	Chem., '43	Perth Amboy, N.J.

Ward, Harlow Elwood, Jr.	I.E., '41	Carbondale
Ward, Parker Vincent	Bus., '43	Worcester, Mass.
Ware, Richard Anderson	Arts, '41	Staten Island, N.Y.
Warner, Everett Frazar	Arts, '42	Short Hills, N.J.
Warwick, Robert Orem	I.E., '43	Wayne
Watt, Robert Douglas	Arts, '43	Bridgeport, Conn.
Watts, Richard Nichols	Bus., '41	Brielle, N.J.
Weaver, Earl Lewis, Jr.	M.E., '42	Allentown
Weber, Kurt Heinz	Phys., '42	Tenafly, N.J.
Weening, Jay Louis	E.E., '43	New York, N.Y.
Weigel, Albert Schofield	I.E., '41	East Orange, N.J.
Weigel, Peter John	Arts, '43	Plainfield, N.J.
Weil, Martin Avram	Arts, '41	New York, N.Y.
Weinrib, Stephen	Arts, '41	New York, N.Y.
Weise, Frank Earl, Jr.	Met.E., '41	Bridgeville
Weiskopf, William Albert	M.E., '44	Bethlehem
Weller, Robert	I.E., '43	Maplewood, N.J.
Wells, David Francis	Ch.E., '42	Long Beach, N.J.
Wells, Richard Carter	I.E., '41	Baltimore, Md.
Weltz, Robert Earl	Ch.E., '44	Swarthmore
Wenck, William Taylor	Bus., '43	Allentown
Werft, Harold Hoover	E.M., '41	Altoona
Werkheiser, Willard Tilghman	Ch.E., '44	Nazareth
Werner, Henry Gabriel	Phys., '41	Philadelphia
Wertz, Robert Maxwell	Bus., '44	Belleville, N.J.
Wetrich, Jeffry Steven	Bus., '42	Hempstead, L.I., N.Y.
Wetrich, Thomas Donald	Bus., '44	Hempstead, L.I., N.Y.
Wetzel, Charles Mark, II	I.E., '44	Wayne
Whalen, Powell Joseph, B.S. in C.E.	E.M., '42	Burlington, Vt.
<i>(University of Vermont)</i>		
Whipple, Robert Parsons	Ch.E., '43	Oil City
White, Arthur John	I.E., '44	Valley Stream, N.Y.
White, Emmet Talmadge, Jr.	Bus., '42	Hillside, N.J.
White, Lee Robert	Phys., '42	Middletown
Whiting, John White, Jr.	Bus., '41	Williamsport
Whiting, Philip Charles, Jr.	Bus., '43	Holyoke, Mass.
Wiedenman, Robert Jay	Ch.E., '44	Harrisburg
Wieland, Walter	Bus., '41	Scranton
Wielkopolski, Theodore	M.E., '43	Arlington N.J.
Wigg, James Ellsworth	Bus., '42	Upper Montclair, N.J.
Wiggin, Alexander King	I.E., '42	East Orange, N.J.
Wiley, Robert Arthur	Bus., '44	Ridgewood, N.J.
Wiley, William Wallace	Bus., '44	Plainfield, N.J.
Wilhelmy, Normand Joseph	Bus., '42	Marlboro, Mass.
Willard, Raymond Sentman, Jr.	E.E., '42	Coatesville
Williams, Archibald Lynn, Jr.	Bus., '44	Westfield, N.J.
Williams, Edward Franklin	Ch.E., '41	Ashland
Williams, Howard Misson	Bus., '42	Allentown
Williams, John Michael	M.E., '43	Maplewood, N.J.
Williams, John Ross	Arts, '43	Nanticoke
Williams, Joseph Adolph	Ch.E., '44	Allentown
Williams, Kingsley Grant	Chem., '42	Woodbury, N.J.
Williams, Roger, Jr.	Bus., '41	Bogota, N.J.
Williams, Thomas Wright, III	Bus., '44	Orange, N.J.
Williams, William Robert	Arts, '43	Scranton
Williamson, Clyde Patrick	Arts, '41	Hillsdale, Kans.

STUDENTS

Williamson, John Davison	Bus., '44	Upper Black Eddy
Willmann, William Godfrey	Chem., '42	Bethlehem
Wilson, Charles Dengler	Bus., '44	Bethlehem
Wilson, Fredric Woodbridge, Jr.	Bus., '41	West Point Pleasant, N.J.
Wilson, Nathan Leland, Jr.	Ch.E., '43	Downingtown
Wilson, Robert Alexander	M.E., '41	Altoona
Wilson, Robert Henry	Bus., '44	Baederwood
Winco, Thomas Robert	Ch.E., '44	Philadelphia
Wirths, Wallace Richard	Bus., '42	Grantwood, N.J.
Wise, William James	Bus., '41	Bellevue
Wiser, Forwood Cloud, Jr.	M.E., '43	Chester
Witherspoon, James William	M.E., '42	Tuckahoe, N.Y.
Witmeyer, John Robert	Ch.E., '41	Bethlehem
Witte, Quintus Peter, Jr.	Arts, '43	Munsey Park, L.I., N.Y.
Wittman, Ralph	M.E., '43	Philadelphia
Woelfel, George Wilmot	C.E., '41	Hazleton
Wolf, Allan Ehrman	I.E., '43	Memphis, Tenn.
Wolf, Irwin Damascus, Jr.	Bus., '41	Fox Chapel
Wolfe, Elwyn	E.E., '42	Easton
Wolff, Ahlert Diedrich	Bus., '42	Easton
Wolfsten, George William, Jr.	Arts, '43	Melrose Park
Wood, Richard Francis, Jr.	Arts, '43	Larchmont, N.Y.
Woodling, Roy Edgar, Jr.	E.M., '41	Bethlehem
Woodrooffe, Philip Benson	Bus., '43	Albany, N.Y.
Woodruff, Stephen Clarke	Chem., '44	Westfield, N.J.
Woodruff, William Russell	Ch.E., '42	Teaneck, N.J.
Woods, James William	Chem., '43	Winnetka, Ill.
Woods, Thomas Brooks	E.E., '41	Jackson Heights, N.Y.
Woodside, William Stewart, Jr.	Ch.E., '43	Baltimore, Md.
Wooters, John Dukes, Jr.	Bus., '41	Larchmont, N.Y.
Worrell, Guy Crawford, Jr.	M.E., '43	Westfield, Mass.
Wotring, Kenneth Clinton	I.E., '41	Catasauqua
Wrench, Harry Kirke, Jr.	Bus., '44	Minneapolis, Minn.
Wright, Frederick Wallis, Jr.	Arts, '42	Boonton, N.J.
Wright, Paul Eugene	Ch.E., '44	Newport
Wright, Robert, Jr.	I.E., '44	Haddonfield, N.J.
Wright, Stephen Cole	Arts, '43	Coatesville
Wythe, Donald Howard, Jr.	E.E., '44	Pusay, Rizal, P.I.
Yankevitch, John James, Jr.	Arts, '41	Freeland
Yastrzab, John Carl	E.E., '43	Northampton
Young, Franklin Haldeman	Bus., '43	Phoenixville
Young, Jacob Forney, Jr.	I.E., '41	Hagerstown, Md.
Young, Robert Rochester	M.E., '42	Philadelphia
Young, Whitney James	M.E., '42	Bethlehem
Youngling, George Smylie	M.E., '44	Freeport, N.Y.
Yurkanin, Richard John	E.E., '42	Bethlehem
Zachary, Roy Shackleford	Arts, '41	South Orange, N.J.
Zackey, Roy Tyson	M.E., '44	Roslyn
Zalkind, Sheldon Stanley	Arts, '43	New York, N.Y.
Zane, Allen Herbert, Jr.	I.E., '41	Long Island City, N.Y.
Zane, Hysler Bernard	I.E., '41	East Orange, N.J.
Zanoni, Alfred Lewis	I.E., '42	Raritan, N.J.
Zimmermann, Frank Andrew	Bus., '41	Baltimore, Md.
Zipf, George Glenn	Met.E., '42	Bryn Mawr
Zucker, William Kenward, Jr.	Bus., '44	Mount Vernon, N.Y.

SUMMER SESSION, 1940

Adams, Donald Buxton	Montclair, N. J.
Adams, John Marion	Allentown
Ahl, Charles Emmerling, Jr.	Pittsburgh
Alberts, John Clark	Plainville, Conn.
Allen, John Purdon	Upper Montclair, N.J.
Allgrunn, Albert Edwards	Milford
Anderson, Raymond Burr, Jr.	Eggertsville, N.Y.
Andrews, Joseph Elliott, Jr.	Pittsburgh
Apolenis, Charles John	Allentown
Appel, Helen Ruth	Bethlehem
B.A. (<i>Moravian College for Women</i>)	
Arbogast, Joseph Fredrick	Harrisburg
Arndt, Norman Vinton	Saylorsburg
B.S. (<i>East Stroudsburg State Teachers College</i>)	
Ashley, Robert Edward	Muskegon, Mich.
Bachman, Gerald Herster	Bethlehem
Backensto, Elwood Bruce	Emmaus
Bacon, Florence Helen	Bethlehem
Baiko, Boris	Brooklyn, N.Y.
Bailey, Frank Harvey	West Hartford, Conn.
Bailey, Joel Furness	Bethlehem
B.S. (<i>Purdue University</i>)	
Bailey, Robert Dudley	Summit, N.J.
Baldwin, Clifford Clarence	Philadelphia
Barker, Robert Scott	Montclair, N.J.
Bartholomew, Kenneth Robert	Bethlehem
Bartholomew, Luther Roth	Quakertown
Bartholomew, Paul Hopkins	Palmerton
B.S. (<i>Lehigh University</i>)	
Bartholomew, Robert Hopkins	Palmerton
Bauder, Burton Eberman	Bethlehem
Bauer, Tryon Fritch	Bethlehem
B.S. (<i>Muhlenberg College</i>)	
Beal, John Phillip, Jr.	Montclair, N.J.
Beaumont, Warren Harding	Summit, N.J.
Becker, Barbara Alice	Bethlehem
Becker, Helen Elizabeth	Bethlehem
Bedell, Donald Warner	Allentown
Belcher, John Fullam	Mount Vernon, N.Y.
Bell, Thomas Robert, III	Brookline, Upper Darby
Bender, Donald Austin	New York, N.Y.
Benedict, George Beverly	Albany, N.Y.
Bennett, Charles Surface	Nazareth
Berger, Fred Willard	Matamoras
Betterton, Jesse Oatman, Jr.	Metuchen, N.J.
Binger, Frank George	Elizabeth, N.J.
Birkhead, Taylor Albert	Baltimore, Md.
Bishop, Edwin Samuel	Puerto Cabezas, Nicaragua
Bixby, Carl Lyndon Jr.	Southport, Conn.
Blake, John Harvey	Garden City, N.Y.
Blank, Howard Allen	Lehighton
Blum, Edward	Allentown
B.S. (<i>Muhlenberg College</i>)	

Bollman, Philip D. (<i>Pennsylvania State College</i>)	Bath
Boore, William Filson	Teaneck, N.J.
Bostock, William Thomas, Jr.	Roselle Park, N.J.
Boucher, James Henry	Catasauqua
Bower, Frank Hugo	Rutherford, N.J.
Bowman, Robert McClarey	Wyncote
Boyer, Charles Edwin	Bowmanstown
Boyer, Edward George	Norristown
Boyer, Glenn Winfield	Hershey
Boyer, Harry Lester, Jr.	Drexel Hill
Boyer, Warren Franklin	Bowmanstown
Boynton, Horace William	Roselle, N.J.
Bozza, Daniel Nicholas	Newark, N.J.
Bozza, Ralph A.	Newark, N.J.
Bradford, Thomas Paisley	Wheeling, W.Va.
Brawn, Earl Albert	West Orange, N.J.
Breen, Alvin Leonard	Portland
Breinig, Warren Lewis	Nazareth
Brkich, Alexander	Bridgeport, Conn.
Brodnitz, William Hugo B.S. (<i>Columbia University</i>)	Washington, D.C.
Brooks, William Alexander	Newark, N.J.
Brown, Anita Ruth B.S. (<i>University of Pennsylvania</i>)	Bethlehem
Brown, Carl Frederick	Bethlehem
Brown, Douglas MacGillvary	Bethlehem
Brown, Edwin Augustus	Bethlehem
Brown, Herbert Albert	Milford, Conn.
Brown, Mae Weaver B.A. (<i>Moravian College for Women</i>)	Hellertown
Brown, Rachel Elizabeth B.A. (<i>Wilson College</i>)	Allentown
Brubaker, John Henry	Easton
Brundage, Frank Taylor, Jr.	Norwalk, Conn.
Bryan, John H., Jr.	Westfield, N.J.
Buck, Thomas Mathieu	Philadelphia
Bunning, Herbert Edward	Bronxville, N.Y.
Burgio, John	Caldwell, N.J.
Burgy, Marion Clayton	Peoria, Illinois
Bushey, Thomas Lee	Haddonfield, N.J.
Bushwaller, Charles Robert	Honesdale
Buss, James Harvey, II	Elmhurst, N.Y.
Butts, Philip Guernsey	Bethlehem
Buxton, Edwin Franklin Abell, Jr.	Bethlehem
Byrne, Arthur George	Great Neck, N.Y.
Caldwell, Solomon Pusey	West Grove
Camarda, Frank Vincent	Plainfield, N.J.
Canizares, Arlington Ward	Wayne
Caplan, Stanley	Allentown
Caproni, John Daniel	Pine Orchard, Conn.
Carcione, Anthony Ralph	Bethlehem
Carroll, Gerald Vincent	Meriden, Conn.
Chamberlain, Robert Elmer	Lyndhurst, N.J.
Christensen, Mildred Balmer	Bethlehem
Clark, Albert, Jr.	Nanticoke

Clark, Gordon Manson	Hamden, Conn.
Clark Nelson Raymond, Jr.	LaGrange, Illinois
Clark, Robert Wesley	Lakewood, N.Y.
Clark, William Henry, Jr.	Rutherford, N.J.
Clark, William Lawrence	Mountain Lakes, N.J.
Clemmey, John L., Jr.	Fall River, Mass.
Clewell, Willard Stanley	Bethlehem
Clokey, Allison Walter	Rutherford, N.J.
Coffey, Edward John, Jr.	Bethlehem
Cole, Charles Benjamin	Union, N.J.
Coleman, Robert Henry	Flushing, N.Y.
Colquitt, Julian Heyl	Washington, D.C.
Colwell, Oakes Maxcy	Caldwell, N.J.
Compton, Joseph Gordon	Flushing, N.Y.
Compton, Lawrence Hamlin	Bethlehem
Comstock, George Stedman	Bethlehem
Connelly, John Robert	Bethlehem
B.S., M.S. (<i>University of Illinois</i>)	
Conroy, Robert Bellerou	Doylestown
Contreras, Wenceslao Jose	Bethlehem
Coon, Alfred Harden, Jr.	Kingston
Cooper, David Earnshaw	Harrington Park, N.J.
Cory, Samuel Isaac	Towaco, N.J.
Cowin, Roy Burford	Bethlehem
Cox, Samuel Robert	Lancaster
Creitz, Mary Louise	Easton
A.B. (<i>Cedar Crest College</i>)	
Critchlow, John Nisbet	St. Michaels, Maryland
Cross, Albert James	Scranton
B.A. (<i>Lehigh University</i>)	
Cullen, Robert Emmett, Jr.	Kennett Square
Cunningham, Thomas Patrick, Jr.	Richmond Hill, N.Y.
Curll, Edwin Levering	Easton
Curtis, John Seaton	Youngstown, Ohio
Curtiss, Charles Dwight, Jr.	Chevy Chase, Md.
Custer, Granville Yocum	Chevy Chase, Md.
Dabb, William Robert	Elizabeth, N.J.
Davis, Edna Hodson	Camden, Maine
Davy, Samuel Jackson	New Castle
Daws, Thomas William	Easton
Day, A. William	Nazareth
A.B. (<i>Muhlenberg College</i>)	
deBeauchamp, David George	Westfield, N.Y.
DeCowsky, George Nestor	Pennsburg
DeGiacomo, Gene Michael	Port Chester, N.Y.
Descheemacker, August	Hanover
Deveraux, Harold	Shamokin
Devitt, John Edmund	Mountain Top
DeVoe, Elliott Thomas	Washington, N.J.
Diehl, Leonard Hastings, Jr.	Harrisburg
Dieringer, Lawrence Fred	Dumont, N.J.
Domlesky, Leonard Albert	Minersville
Doney, Robert Henry	Pen Argyl
Dorkin, Jerome Richard	Camden, N.J.
Dragone, Rosario Roy	Brooklyn, N.Y.
Drustup, Thomas Grebe	Upper Black Eddy

SUMMER SESSION STUDENTS

Dunham, Willard Wilson, Jr.	Fords, N.J.
Dunn, Frank Rothwell, Jr.	Philadelphia
Dunning, Roger Abram	East Stroudsburg
B.S. (<i>East Stroudsburg State Teachers College</i>)	Bangor
Durkee, Robert Lee	Bangor
B.S. (<i>Pennsylvania State College</i>)	Morristown, N.J.
Dutton, Charles Bockoven	Ridley Park
Eastlake, Donald Egglestown, Jr.	Batavia, N.Y.
Edwards, Edward Walter	Bethlehem
Edwards, Leonard Harden	Bethlehem
Eisenhart, Luther William	South Orange, N.J.
Eisner, William Stanley	Washington, D.C.
Elliott, George Earl, Jr.	Bethlehem
Ellis, Ann Corson	Ridley Park
Elmes, Badgley Allen	Pleasantville, N.J.
Endicott, Somers Harrison, Jr.	Bethlehem
Erich, Norman Elwood	Bangor
Evans, Granville Robert	
A.B. (<i>Moravian College</i>)	Reading
Eways, Musa Joseph	Lehighton
Farren, Daniel Irvin	
B.S. (<i>Muhlenberg College</i>)	Bethlehem
Felker, James Barnet	Nazareth
Feller, Gordon Stanley	
B.A. (<i>Muhlenberg College</i>)	North Tarrytown, N.Y.
Ferris, George Schernerhorn, Jr.	Washington, D.C.
Finch, Chester Lee	Plainfield, N.J.
Finney, William Frederick, Jr.	Oreland
Fisher, Robert Joseph	Palmerton
Fiske, Kathryn Lovice	New Britain, Conn.
Fitzell, Paul Boris	Indianapolis, Indiana
Fleischer, Thomas	Reading
Fluck, William Franklin Sigafos	
B.S. (<i>Muhlenberg College</i>)	Bridgeport, Conn.
Foley, William Francis	Philadelphia
Foster, Harold Earl	Bethlehem
Foster, Richard MacDonald	Wilkes-Barre
Foust, Philip Gray, Jr.	Catasauqua
Frederick, John Adam, Jr.	Reading
Freeman, Robert High	Throop
Friedman, Harry Jerome	Bethlehem
Friedman, Morris Samuel	Danville
Fry, William Earl	Bethlehem
Fuller, Robert Watson	Cleveland Heights, Ohio
Fuller, William Whitslar	Freeland
Gabuzda, Joseph Cyril	Bethlehem
Gahagan, Philip James	Niagara Falls, N.Y.
Gailey, Robert King	Portland, Me.
Galli, James Henry	Langhorne
Gamble, Ernest, Jr.	Gettysburg
Garvin, Henry Watterson, Jr.	South Orange, N.J.
Gaus, Gilbert Daniston	Allentown
Geisinger, Eleanor Ruth	
B.S. (<i>Cedar Crest College</i>)	Bethlehem
Geissinger, Sarah Ann	
A.B. (<i>Wilson College</i>)	

Georgopulo, Panos Basil	New York, N.Y.
Gilmore, Wheeler, Jr.	Secane
Godfrey, Howard Johnson	Bethlehem
B.S. (<i>Tufts College</i>)	
Godycki, Ludwig Edward, Jr.	Hellertown
Gonzalez, Ignacio Albert	Bethlehem
Good, William Eckert	Riverton, N.J.
Gore, James, III	Coraopolis
Goshorn, William Webster	Malvern
Gould, Gregory	North Tarrytown, N.J.
Gray, John Raymond	Richmond Hill, N.Y.
Greene, Leonard Robert	Brooklyn, N.Y.
Gregory, David Evans	Norwalk, Conn.
Gressitt, John	Evanston, Illinois
Griffith, George Leslie, Jr.	Cranford, N.J.
Gross, Joseph Eugene	Philadelphia
Grove, Gertrude Milissa	York
B.S. (<i>Hood College</i>)	
Grubb, Harold Alexander	North Hills
Gruber, William Dietrich	Bethlehem
Guidon, Michael, III	Freemansburg
Guttschall, Rudd Moyer	Mount Union
Haas, Norman Jordon	Belmont, Mass.
Haines, Harold Woodbury	Short Hills, N.J.
Haire, Douglas Mathiston	Maplewood, N.J.
Hall, Warren Nethercott	Jamestown, N.Y.
Hallingan, Robert Rawson	West Orange, N.J.
Hamm, Franklin Albert	Allentown
B.S. (<i>Muhlenberg College</i>)	
Hammer, Robert Mohr	Allentown
Hammond, Robert Arrison	Allentown
Handwerk, Ira Paul	Bethlehem
A.B. (<i>Lafayette College</i>)	
Haney, Ralph Leighton	Norristown
Hanline, Wilson Clinton	Philadelphia
B.S. (<i>Lehigh University</i>)	
Harding, Arthur Harold	East Orange, N.J.
Harnisch, Robert Edwin	Maplewood, N.J.
Harper, Milton William	Seaford, Del.
Hartdegan, Carl, III	Maplewood, N.J.
Hartzell, Jacob Shaffer	Nazareth
B.A. (<i>Lehigh University</i>)	
Haven, Gilbert Pond	Cleveland Heights, Ohio
Havenstein, Paul Lieder	Wellesley Hills, Mass.
Hayes, William Daniel	Windber
Hazard, Richard Parce	Morrisville
Hechtman, Robert Aaron	Seattle, Wash.
B.S., M.S. (<i>University of Washington</i>)	
Hemmerly, Ruth Fern	Bethlehem
Hemphill, Albert Weimer, Jr.	Upper Montclair, N.J.
Henderson, Charles English, III	Gibson Island, Md.
Herold, Harry Albert, Jr.	Bristol, Conn.
Herr, Sara Louise	Akron
Herzer, Charles John, Jr.	Allentown
Heverly, John Ross	Pennsburg
B.S., M.S. (<i>Pennsylvania State College</i>)	

SUMMER SESSION STUDENTS

Hewitt, Frank Howard, Jr.	Maplewood, N.J.
Hill, Robert Leon	Dunmore
Hillenbrand, Louis Joseph, Jr.	Allentown
Himmelwright, Warren Alfred	Bethlehem
Hinrichs, Alan Dabney	New Rochelle, N.Y.
Hird, Ralph Craven	Englewood, N.J.
Hitchcock, William Paige	Syracuse, N.Y.
Hoffman, Chester Adam	Allentown
Hoffman, Warren Edward	Union, N.J.
Hoffner, Bernard Earl	Bethlehem
Holberton, Thomas Sier Cummings, Jr.	Hackensack, N.J.
Hollander, Seymour Lawrence	Maplewood, N.J.
Hood, John Merrill	Arlington, Va.
Hopkins, Richard Charles	Narberth
Horka, Alfred Edward	Passaic, N.J.
Horn, Fenwick Peck	Lansdowne
Horton, Frank Reed	Easton
A.B., MA. (<i>Lafayette College</i>)	
Houseberg, Ernest James	Bangor
Houseman, John	Allentown
Houston, William Osborne	Old Greenwich, Conn.
Huber, Herman Arnold	Narrowsburg, N.Y.
Hunold, Frank Addison	Port Washington, N.Y.
Hutchinson, Edwin Joseph	Allentown
Innes, Charles Barron, Jr.	Bethlehem
Irvin, William Edward, Jr.	Gary, Indiana
Ivey, Floyd Emerson	Bethlehem
Jackson, Thomas Edgar	Bethlehem
B.S. (<i>Carnegie Institute of Technology</i>)	
Jardine, William Donald	Buffalo, N.Y.
Johler, Robert Andrew	Scranton
Johnson, Howard Alexander	Niagara Falls, N.Y.
Jones, Harry Witmer, Jr.	Harrisburg
Kaplon, Morton Fischel	Brunswick, Md.
Keating, Joseph Francis	Bethlehem
Keenan, Robert Edward	Allentown
Kelechava, Theodore	Allentown
Kellett, John III	Springfield
Kerchmar, Rudolph	Bethlehem
Kern, Franklin Brooks	Cleveland Heights, Ohio
Kidder, James Henry	Germantown
Kiessling, William Theodore	St. Louis, Mo.
A.B. (<i>Washington University</i>)	
Kimberley, John Arthur	Dalton, Mass.
Kirk, Richard Leslie	Harrisburg
Kister, Edward Arthur	Brooklyn, N.Y.
Kistler, David Lyle	Hamburg
Kitson, Walter Roland	Westfield, N.J.
Klein, Louis Edward	Easton
Kleppinger, Donald Henry	Bethlehem
Klick, Clifford Coover	Kutztown
A.B. (<i>Muhlenberg College</i>)	
Klopp, Frederick Schlosman	Shillington
Koromitz, Peter	Allentown

Kostenbader, Margaret Edwina B.S. (<i>Muhlenberg College</i>)	Wind Gap
Kough, Harold	Pompton Plains, N.J.
Kowalyszyn, Russell B.A. (<i>Lehigh University</i>)	Northampton
Kramer, Frederick Franklin, III	Allentown
Kremser, Harold LeRoy, B.S. (<i>Muhlenberg College</i>)	South Temple
Krick, Douglas Sterling B.S. (<i>Syracuse University</i>)	Easton
Krissiep, Max, Jr.	Wyomissing
Krone, Frederick Albert	Freeland
Kroupa, Charles Emil	Woodside, N.Y.
Kucey, Stephen John	Bethlehem
Kuhar, William Anthony	Bethlehem
Kulp, Richard Lincoln	Bethlehem
Lagouros, John Emanuel	Bethlehem
Lambert, Beulah Florine	Bethlehem
Lampert, John Carl	Carlstadt, N.J.
Lamson, Barbara	Bethlehem
Lamson, Helena	Bethlehem
Landis, John Prince	Old Greenwich, Conn.
Laponsky, Alfred Baer	Brownsville
Larson, Leonard Dale	Shaker Heights, Ohio
Latimer, Elwood D., Jr	Scranton
Layton, Donald William	Brooklyn, N.Y.
Leach, George Harold	Roselle, N.J.
Leaver, Ross Wilburton	Chester, N.J.
Leibenguth, Raymond Henry Ph.B. (<i>Muhlenberg College</i>)	Allentown
Leichliter, Otto Gay	Pittsburgh
Leifheit, Howard Clifford	Queens Village, N.Y.
Leiner, Roy Fred	Easton
Lesh, Nathan George	Wind Gap
Lindsay, William Henry, Jr.	Haddonfield, N.J.
Llewellyn, Harold Zelpohehad	Summit Hill
Logan, Robert	Coatesville
Loose, Robert Jacob	West Orange, N.J.
Loucks, Jesse Brodbeck	York
Loughran, John Louis	Philadelphia
Loveland, Gordon George	Babylon, N.Y.
Lucarelle, Nicholas Joseph	Bridgeport, Conn.
Luce, William Taylor	Metuchen, N.J.
Luse, Andrew Philetus	Newton, N.J.
Lutz, George Arthur	Mahanoy City
Lutz, George Rufus, Jr.	Reading
Lyons, Robert James	Steubenville, Ohio
MacAllister, Thomas Crawford, Jr.	Milford, Conn.
MacMinn, John Linnaeus	Williamsport
MacNeill, Margaret Mary Love	Bethlehem
Macy, Robert Russell	Kensington, Md
Madsen, Ingvald Elias S.B. (<i>Massachusetts Institute of Technology</i>)	Bethlehem
Mahla, Elbert Myron B.S. (<i>Lehigh University</i>)	Lorain, Ohio
Mainwaring, William Thomas	Pittsburgh

SUMMER SESSION STUDENTS

Malley, John Edward	Minersville
Malley, Wallace Ward	Hamden, Conn.
Maloney, John Joseph, Jr.	Forty Fort
Manion, Keron Martin	Clifton, N.J.
March, Brookman Jack	Shillington
Marcks, Helen Jane	Allentown
Ph.B. (<i>Mublenberg College</i>)	
Marshall, Robert Henry	Kennett Square
Marusi, Gene A.	New York City, N.Y.
Mascuch, Richard	South Orange, N.J.
Mason, Richard Withington	Foxboro, Mass
Matzko, John Joseph	Saint Clair
Maurer, Joseph Abele	Bethlehem
A.B. (<i>Moravian College</i>)	
Maxwell, John Walter	Bethlehem
B.S. (<i>Lehigh University</i>)	
McConnell, Malcolm Findley, Jr.	Pittsburgh
McConnor, William Sandborn	Pittsburgh
McDonnell, Hubert, Jr.	Greenwich, Conn.
McElroy, William Pershing	Bridgehampton, N.Y.
McGee, John Joseph	Allentown
McGonigle, John Leo, Jr.	Allentown
McGovern, John Joseph	Bethlehem
McGrath, Charles Edward	Scranton
McGregor, Robert John	Dunmore
McJames, William Charles	South Orange, N.J.
McKanna, Edwin Alexander, Jr.	South Pasadena, Cal.
McKenna, Frank Shirley	Crafton
McMichael, Robert Charles	Chester
McNamara, John Joseph	Bethlehem
Ph.B., M.A. (<i>Mublenberg College, Columbia University</i>)	
McNamara, Roger James	Bethlehem
McPherson, Donald Wesley	Hellertown
B.S. (<i>West Chester State Teachers College</i>)	
Meharg, Helen Louise	Hamburg
Meikle, William Jackson	Harrisburg
Merkel, Roy Thomas	Macungie
B.S. (<i>Franklin and Marshall College</i>)	
Messinger, Claude Orison	Bethlehem
Metcalf, Albert Traver, Jr.	Pottstown
Metius, Richard Edward	Narberth
Mettler, John Daniel	Crowl
Middleton, Donald Mayo	Pittsburgh
Miller, Albert Marshall	St. Petersburg, Florida
Miller, John Wesley Hartzell	Bala-Cynwyd
Miller, Leonard Hanmer	East Orange, N.J.
Miller, Robert Bruce	Bethlehem
Minde, George Francis	Summit, N.J.
Miskinis, Argina Madeline	Easton
B.F.A. (<i>William and Mary College</i>)	
Mitchell, Charles Froelicher	Larchmont, N.Y.
Mitchell, Jackson Froelicher	Larchmont, N.Y.
Mitman, Thomas Overfield	Mauch Chunk
A.B. (<i>Lafayette College</i>)	
Mixner, Joseph Harold	Ithaca, N.Y.

Moatz, Clarence Henry	Northampton
B.A., B.D. (<i>Moravian College, Eastern Theolog Seminary</i>)	
Mohr, Luther Albert	Reading
Moll, Harvey Donald	Lansdale
Moog, Arthur Edward	Summit, N.J.
Moore, Robert Condit	Maplewood, N.J.
Morehouse, Donald Quimby	Watertown, N.Y.
Mortimer, Ewen Montford	Bethlehem
Mostyn, Thomas Albert	Hamilton Square, N.J.
Muehlberg, John Richard	Montclair, N.J.
Mueller, John Haines	York
Mueller, Richard William, Jr	Pittsburgh
Muhlhausen, Edgar Kirton	Brooklyn, N.Y.
Mumbauer, Eleanor Dengler	Bethlehem
B.A. (<i>Moravian College for Women</i>)	
Needles, James Warden	Cape May, N.J.
Nehf, Charles Henry	Allentown
B.S. (<i>Muhlenberg College</i>)	
Neill, Alexander Bold, Jr.	Upper Montclair, N.J.
Nelken, Hans	New York, N.Y.
Nestleroth, Paul Lavern	Elm
Neuendorffer, Carl	North Tarrytown, N.Y.
Newhard, Raymond Amandus	Northampton
Neilson, Howard Leroy	Chicago, Illinois
Niemeier, Russell C., Jr.	Pittsburgh
Niemeyer, James Walter	Dunmore
Norris, Kenneth Harold, Jr.	Maplewood, N.J.
Novitski, Frank	New York, N.Y.
Nowicki, Zenon Edwin	Bethlehem
Oberholzer, Ernest Rudolf	Allentown
Obert, Joseph G.	Lehighton
B.S. (<i>Lehigh University</i>)	
Okamoto, Allen Hisayoshi	Willow Grove
Olmstead, Harry Lester	Staten Island, N.Y.
Ondra, Otakar	Mor. Ostrava,
B.A., Dipl. Ing. (<i>College Francais de Prague, Technical University of Prague</i>)	Czechoslovakia
Organ, Ewing H.	Allentown
B.S. (<i>Syracuse University</i>)	
Osborn, David Chittenden	Shaker Heights, Ohio
Oswald, Harold Samuel	Lehighton
B.S. (<i>Muhlenberg College</i>)	
Over, Arthur Mead	Pittsburgh
Palazzo, Ralph Dominik	Trenton, N.J.
Parkinson, Ralph Bruce	Glenaside
Patten, Charles Anthony	Allentown
Paul, George Burr	Palmerton
B.S. (<i>Pennsylvania State College</i>)	
Paul, Richard Chadwick	York
Paynter, Harry Vaughn	Philadelphia
Payrow, Harry Gordon, Jr	Bethlehem
Pearce, Robert James	Marquette, Mich.
Peck, William Jarvis	Riverside, Conn.
Petersen, Richard Gray	Pittsburgh
Peterson, John Louis	Wood Ridge, N.J.
Phillips, George Wesley	Edgeworth

Pillar, William John	Bethlehem
Platoft, Zena	Quakertown
B.S. (<i>Drexel University</i>)	
Poetter, Robert Kingman	Glen Rock, N.J.
Pohl, Henry Ernst	St. Albans, N.Y.
Powers, Philip Henry, Jr.	Pittsburgh
Prang, Philip John, Jr.	Easton
Prince, Eleanor Harwood	Bala-Cynwyd
Prince, Ruth Bailey	Bala-Cynwyd
Prinkey, Clarence Orland	Yonkers, N.Y.
Prinkey, John Ward, Jr.	Yonkers, N.Y.
Propper, Theodore David	Woodmere, N.Y.
Quincy, John Adams	Briarcliff Manor, N.Y.
Rahn, Kenneth Hauser	Palmerton
Randall, Lewis Parker, Jr.	Trenton, N.J.
Rappuhn, Henry Wallace	Great Neck, N.Y.
Raub, Arthur Llewellyn, Jr.	Easton
Raub, Edwin Stanley	Easton
Rauer, Robert B.	Poughkeepsie, N.Y.
Reichard, Robert Brightbill	Catasauqua
B.S. (<i>Kutztown State Teachers College</i>)	
Reichardt, Charles Henry	Milltown, N.J.
B.S. (<i>Rutgers University</i>)	
Reichenbach, Harry Archibald, Jr.	Bethlehem
Reineking, George Bartos	Arlington, N.J.
Reinhart, Walter Lentz	Allentown
B.S. (<i>Muhlenberg College</i>)	
Remsen, Irving Baker	Trenton, N.J.
Remsen, William K.	Staten Island, N.Y.
Rich, Francis Marion, II	Bethlehem
Richards, David, Jr.	Scranton
Ricks, James Benjamin	New York, N.Y.
Ph.B. (<i>Brown University</i>)	
Riley, Joseph Tulley	Bethlehem
Ritter, Eleanor Marie	Allentown
Ph.B. (<i>Muhlenberg College</i>)	
Ritter, Ralph Shelley	Allentown
B.S. in E.E. (<i>Lehigh University</i>)	
Robertson, Charles Thompson, III	Philadelphia
Robinson, Donald Worthington	Buffalo, N.Y.
Roche, Helen Patricia	Bangor
A.B. (<i>St. Joseph's College</i>)	
Rodgers, Douglas Hill	Port Washington, N.Y.
Rodgers, Robert Elliott	Allentown
Roedder, Edwin Woods	Devon
Rosenquest, Robert William	Essex Fells, N.J.
Roslund, Arthur Elfred	Flushing, N.Y.
Roth, Richard Charles	Buffalo, N.Y.
Ruch, Austin William	Schnecksville
Saltzer, Jay Blaine	Slatington
B.S. (<i>Bloomsburg State Teachers College</i>)	
Sanders, Donald George	Passaic, N.J.
Savage, Charles Henry	Morristown, N.J.
Sawyer, Alice Dorothea	Bethlehem
B.A. (<i>Moravian College for Women</i>)	
Saylor, John Seltzer, Jr.	Reading

Saylor, Robert Webster	Harrisburg
Schall, Josef William	Sellersville
Schaper, David Henry	Erie
Schappel, Reuel Samuel	Allentown
Schmoll, William Rudolph	Bethlehem
Schnell, William Rodman	Croton-on-Hudson, N.Y.
Schork, Ernest Leonard	Maplewood, N.J.
Schramm, Wilson Bohnett	Bayside, N.Y.
Scott, Joseph Doty	Millburn, N.J.
Scott, Theodore Gourdin, Jr.	Orange, Va.
Sears, Murl Wolfe	Cotonsville, Md.
Sebald, Leslie Earl, Jr.	Ridgewood, N.J.
Seiter, Virginia Dwight	Bethlehem
Sellers, John Clark	Ardsey-on-Hudson, N.Y.
Sentz, Lemuel Ellsworth	Felton
Serrill, Joseph Lewis	Newtown Square
Seward, Russell Melvin, Jr.	Altoona
Shearer, James Lamberson	Bethlehem
B.A. (<i>Lehigh University</i>)	
Sheska, Martin	Northampton
Shields, Adelaide Emilie	Bethlehem
B.A. (<i>Moravian College for Women</i>)	
Shimer, Elizabeth Margaret	Bethlehem
Sicher, Ralph Chester	Kutztown
Ph.B. (<i>Muhlenberg College</i>)	
Siegele, William Augustus	Caldwell, N.J.
Silbermann, O. Leon	Bethlehem
B.S. in I.E. (<i>Lehigh University</i>)	
Silfies, Dorothea Wickert	Bethlehem
B.A. (<i>Pennsylvania State College</i>)	
Silliman, Vian Bertram, Jr.	Catasauqua
Silverberg, Jonas	Bethlehem
Simonsen, Robert Neil	Pittsburgh
Sinclair, A. Mary	Akron
A.B. (<i>Albright College</i>)	
Sliwka, Stanley Edward	Bayonne, N.J.
Smith, Frank Edgar	Clifton, N.J.
Smith, Franklin Harrison, Jr.	Suffield, Conn.
Smith, Joseph Earl, Jr.	Philadelphia
Smith, Richard Phillip Steers	Philadelphia
Smith, Robert Lee	Frederick, Md.
Smoke, Stephen D.	McKeesport
Snovel, Ellis Raymond	Easton
Snyder, Ruth Naomi	Leesport
A.B. (<i>Mount Holyoke College</i>)	
Somers, John Joseph	Philadelphia
Soprano, Quentin Cletus	Allentown
Southgate, Leslie Orman, Jr.	Jamesburg, N.J.
Spengler, Emerson Daniel	Northampton
Spritzler, Harry Gordon	Bethlehem
Stapleton, Martin Luther	Allentown
B.S. (<i>Kutztown State Teachers College</i>)	
Starke, Edward William, Jr.	Ridgewood, N.J.
Stearns, Clarence Arthur, Jr.	Philadelphia
Steele, Robert Breckinridge, Jr.	Great Neck, N.Y.
Steinbrucker, Frank George	Brooklyn, N.Y.

SUMMER SESSION STUDENTS

Steiner, Charles Henry	Baltimore, Md.
Steinhardt, Ralph Gustave, Jr.	Newark, N.J.
B.S. in Chem. (<i>Lehigh University</i>)	
Stemler, Margaret Marie	Palmerton
A.B., Ph.B. (<i>Randolph Macon, University of Wisconsin</i>)	
Stoddard, Mildred Grace Bennett	Bangor
B.S. (<i>Keystone State Teachers College</i>)	
Stone, George Chickering	Pawling, N.Y.
Stoneback, Ralph Daniel	Quakertown
Storch, Tracy Frederick	Allentown
Stotz, Carl Clemens	Easton
Stowell, Harold Lindsley	Westmoreland Hills, Md.
Strachle, William Thomas	Jamaica Estates, N.Y.
Strouse, William Moss	Harrisburg
Strub, Paul Theodore Weinert	Williamsport
B.S. in Ch.E. (<i>Bucknell University</i>)	
Swartz, Henry Carpenter, Jr.	Gwynedd Valley
Swavely, Katherine E.	Nazareth
Sweet, Philip Anthony, Jr.	Scranton
Swoyer, Robert Stanley	Allentown
Tabet, Georges Elias	Wilmington, Del.
B.S. (<i>American University at Cairo, Egypt</i>)	
Tangel, Julius Edward	Cranford, N.J.
Taylor, Maurice E.	Jermyn
Thevenet, Paul Vernor	Bethlehem
Thomas, John Morgan	Taylor
B.A. (<i>Lehigh University</i>)	
Thompson, Charles McDowell	Rock River, Ohio
Thurn, John A.	Philadelphia
Tillberg, Frederick Carl, Jr.	Philadelphia
Tilton, Robert Lansing	Toms River, N.J.
Titlow, Lester Edwin	Allentown
Tokarczyk, Florent J.	Coaldale
Tolley, William Wooster	Richmond Hill, N.Y.
Tonkin, John Barnett	Clarksburg, W.Va.
Torrens, John R.	West Trenton, N.J.
Townsend, John Platt	Glen Ridge, N.J.
Transue, John Henry	Portland
Tromer, Albert George	New York, N.Y.
Troxel, David Irvin	Quakertown
Tucker, Barclay Earl	Bethlehem
B.S. in Ch.E. (<i>Lehigh University</i>)	
Turner, Robert Burton	Norwood
Urschitz, John Frank	Easton
Utal, Justin Hardwin	Philadelphia
Valenzuela, Gustavo Mario	Santiago, Chile
Valleau, Robert John	Teaneck, N.J.
VanReed, Henry	Reading
Vaughn, Howard Alton, Jr.	Hammonton, N.J.
Velie, Earl Robert	Painted Post, N.Y.
Walling, Richard Raymond	East Cleveland, Ohio
Waltz, Paul Edgar	Bethlehem
A.B. (<i>Pennsylvania State College</i>)	
Warner, Everett Frazar	Short Hills, N.J.
Warwick, Robert Orem	Wayne

Weaver, Paul Oliver B.S. (<i>Ithaca College</i>)	Lehigh
Webb, George William, Jr. B.S. (<i>Muhlenberg College</i>)	Bethlehem
Weber, Kurt Heinz	Tenafly, N.J.
Weening, Jay Louis	New York, N.Y.
Weidner, Henry James B.S. (<i>Muhlenberg College</i>)	Allentown
Weigel, Albert Schofield	East Orange, N.J.
Weigel, Peter J.	Plainfield, N.J.
Weikel, Harold Stanley B.S. (<i>Ursinus College</i>)	Quakertown
Weiss, Harold James	Bethlehem
Wernett, Ada Kemmerer B.S. (<i>Cedar Crest College</i>)	Allentown
Wetzel, Charles Mark	Wayne
White, William Beckler B.A. (<i>Hampden-Sydney College</i>)	Waynesboro, Va
Wielkopolski, Theodore	Arlington, N.J.
Williams, Edward Franklin	Ashland
Williams, John Michael	Maplewood, N.J.
Williams, John Ross	Nanticoke
Williams, Kingsley Grant	Woodbury, N.J.
Willmann, William Godfrey	Bethlehem
Wilson, Charles Dengler	Bethlehem
Wise, William James	Bellevue
Witherspoon, James William	Tuckahoe, N.Y.
Wittman, Ralph Bernstine	Philadelphia
Woodhull, Jean Clarke	Bethlehem
Woodhull, Lois Stanford	Bethlehem
Woodling, Roy Edgar	Bethlehem
Woodroffe, Paul Astor Ph.B. (<i>Muhlenberg College</i>)	Catasauqua
Woodruff, William Russell	Teaneck, N.J.
Worrell, Guy Crawford	Westfield, Mass.
Wright, Frederick Wallis, Jr.	Boonton, N.J.
Wright, Stephen Cote	Coatesville
Wrigley, Robert Alexander	Mahaffey
Yeager, Paul Milton B.S. (<i>Muhlenberg College</i>)	Wescosville
Young, Courtland Wald	Allentown
Yurkanin, Richard John	Bethlehem
Zane, Allen H., Jr.	Long Island City, N.Y.
Zane, Hysler Bernard	East Orange, N.J.
Zanoni, Alfred Lewis	Raritan, N.J.

STUDENTS

SUMMARY OF STUDENTS BY CLASSES AND CURRICULA

Undergraduates	Seniors	Juniors	Sophomores	Freshmen	Special Students	Total
Arts and Science	57	68	71	68	1	265
Business Administration	100	122	121	115	1	459
Chemical Engineering	47	52	72	90	....	261
Chemistry	13	8	16	17	....	54
Civil Engineering	16	12	15	29	....	72
Electrical Engineering	28	29	29	49	1	136
Engineering Physics	7	11	8	4	...	30
Industrial Engineering	40	42	31	50	....	163
Mechanical Engineering	39	45	61	67	1	213
Metallurgical Engineering	19	26	19	28	....	92
Mining Engineering	6	4	6	9	....	25
Total.....	372	419	449	526	4	1770
Graduate Students						171
Undergraduate Students						1770
Students in Summer Session.....						616
Total, less duplications						2093

GEOGRAPHICAL DISTRIBUTION OF STUDENTS, 1940-41

Alabama	1
California	5
Colorado	2
Connecticut	52
Delaware	17
District of Columbia	12
Florida	4
Georgia	4
Illinois	11
Indiana	4
Iowa	1
Kansas	2
Kentucky	1
Maine	5
Maryland	41
Massachusetts	25
Michigan	12
Minnesota	2
Missouri	3
New Jersey	444
New York	299
Ohio	36
Oklahoma	2
Pennsylvania	1048
Rhode Island	5
South Dakota	1
Tennessee	4
Texas	4
Vermont	6
Virginia	7
Washington	4

STUDENTS

West Virginia	9
Wisconsin	3
Wyoming	1
Argentina	1
Canada	3
Chile	2
Cuba	2
England	1
Hawaii	1
Manchuria	1
Moravia	1
Philippine Islands	1
Puerto Rico	1
Turkey	1
Venezuela	1

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